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THE

ANATOMY, PHYSIOLOGY, PATHOLOGY,

AND

TREATMENT OF CANCER.

BY

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AMERICAN EDITOR'S PREFACE.

THE following admirable paper on Cancer, by Dr. Walshe, the distinguished author of the work, on the Physical Diagnosis of Diseases of the Lungs, is republished from the Cyclopaedia of Practical Surgery. The expensive character of that work not allowing the extensive circulation in this country which the article on Cancer deserves, it was thought desirable to print it in a separate volume, and the Editor was called upon to supervise the sheets as they passed through the press. By referring to the Cyclopaedia, it will be perceived that in treating of Cancer of Particular Parts, the author in some places has not entirely completed his subject, that he might not interfere with what would appear in another part of the work, hereafter to be published, under other heads, to which he refers his readers. The American Editor has therefore confined himself to making those additions, chiefly in the surgical operations required, which would render the work more acceptable to the practical surgeon, an account of the operations being added wherever they have been omitted. This task perhaps has been but very imperfectly performed, as it was necessarily done during the short time while the work was passing through the press, and among various other occupations.

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C A N C E R, &c.

ERRATA.

- Page 9. Circinomatous *read* carcinomatous.
" 29. Loubules *read* lobules.
" 66. Size *read* six.

C A N C E R¹.

THE signification of the word Cancer has undergone several changes since its introduction into medical language. It appears to have been originally applied by the Romans to the conditions termed gangrene and sphacelus by the Greeks; while the term carcinoma was employed to designate the affection known by the moderns as cancer²: at a later period, however, authors used it as a synonym of carcinoma or carcinos (καρκίωμα, καρκίνος.) It could serve no useful purpose to inquire whether the fanciful pathologists of early times fixed on this name for the disease, because they discovered a resemblance in the tumor and surrounding dilated veins to the body and claws of the crab; or because they actually believed that an animal devoured the ulcerating parts; or because, as some will have it, they simply wished to convey symbolically an idea of the loathsome character of the complaint; perhaps all three considerations influenced them in its selection. Whatever was the motive in thus naming it, the affection itself was at first

¹ Cancer (καρκίνος, Gr. literally a crab; cancer, Lat. idem; cancer, Fr.; krebs, krebsgeschwür, Ger.; kreeftgezwel, kankergezwel, Dutch; kräfta, kräftskada, Swed.; cancro, canchero, Ital.; cancer, cancro, Span.)

² Par in voc.

presumed to be peculiar to the mamma; but in proportion as morbid states of similar character were found to occur in other parts, they were included under the same general title. Thus we find Paulus ab Æginâ defining cancer, a hard irregular tumor, with or without an ulcer, occurring in any part of the body, but most frequently in the mamma¹. Early observers, struck forcibly by the difference of symptoms in the ulcerated and non-ulcerated stages of the disease, considered it expedient to mark this by a distinction of names; they accordingly restricted the application of the word cancer to the former state, that of scirrhus to the latter. By a further refinement the scirrhus stage was subdivided into two, the simply scirrhus, and the occult cancerous²; the supervention of pain being the signal for the change of name. More modern systematists, turning the word carcinoma from its true signification, distinguish it from cancer by limiting it to the painful scirrhus.

Further, the extreme similarity of some characters of the morbid product, now known as encephaloid, to those of carcinoma, led to the pretty general adoption of the term *soft cancer* for that disease; a new application of the word subsequently resisted by Abernethy and Mr. Wardrop on the grounds of the equally manifest differences subsisting between the two formations. In 1812, however, a distinguished French pathologist, Bayle, recognising more fully than his predecessors the fundamental similarity of soft and hard cancer, of encephaloid and scirrhus, without by any means underrating the importance of their individual peculiarities, maintained the propriety of designating them by the same general name. Unfortunately he marred the excellence of his suggestion by including among cancerous diseases all cutaneous ulcerations of an intractable charac-

¹ Lib. vi. cap. 45.

² Hippocrates.

ter; by thus grouping under the head cancer, affections essentially dissimilar, though agreeing in a single important particular, he contributed materially to engender the uncertainty even now prevailing in France regarding the application of the term.

To our countryman the late Dr. Young, therefore, belongs in reality the merit of having been the first to unite scirrhus (*carcinoma scirrhosum*) and encephaloid (*carcinoma spongiosum*) as species of a genus cancer or carcinoma. But his example has been very slowly followed. English writers, with the exception of Mr. Travers, more keenly perceptive of the differences than of the analogies of these products, have almost to the present day continued to define cancer as ulcerated scirrhus, and separate encephaloid completely therefrom under the title of fungus hæmatodes. Nevertheless opinion had been silently undergoing a change among us; we had been gradually learning to recognise the practical truth and importance of Dr. Young's nosological arrangement, when Dr. Carswell deprived us of all excuse for wavering by satisfactorily proving its justness.

But the researches of Laennec, Otto, Cruveilhier, and more recently of Müller, have distinctly established the close alliance of another morbid product, originally described by the first named of these pathologists under the title of colloid, to scirrhus and encephaloid; to this tissue, therefore, the generic term cancer, as we shall fully show, is equally applicable.

The union of these morbid structures into a distinct class is not a mere nosological artifice; it is manifest that the formations, to which we propose to apply the generic term cancer, possess characters entitling them to be grouped together and separated from all others to which the frame is exposed. They agree *anatomically*, for they are all composed of a containing and a contained part forming a combination without its counterpart in the natural structures;

they agree *chemically*, for they are all distinguished by the vast predominance of albumen in their composition; they agree *physiologically*, for they all possess in themselves the power of growth and of extension by continuity of tissue, that is, of assimilating to their proper substance the most heterogeneous materials—an inherent tendency to destruction and the power of local reproduction; they agree *pathologically*, for they all tend to affect simultaneously or consecutively various organs in the body, and produce that depraved state of the constitution known as the cancerous cachexia. Their title to be united is quite as strong in respect of practical medicine and surgery, as in respect of scientific pathology, a consideration of the very highest importance. As respects the name to be given to the genus, cancer or carcinoma is clearly the best; to limit these terms to one particular tissue, when others possess the very properties on account of which they were originally employed, is a palpable contradiction.

Another doctrine, to which we shall refer elsewhere in the course of this article, has been advanced with regard to the degree of relationship subsisting between these adventitious formations. It is contended by some authors that although each of them acquires individual peculiarities with the progress of development, still they are primarily not merely allied growths, but actually one and the same morbid structure. Without inquiring, for the present, into the validity of this hypothesis, it will suffice to state here, that we shall describe them as distinct productions; and this because all observers who have examined them in their respective stages of full development—that is, when they possess their individual qualities in the highest degree—have noticed such general differences of appearance and of pathological characters, as to warrant such separation. It would be unprofitably trying the reader's patience to enumerate all the peculiarities, petty or impor-

tant, in the opinions of Hodgkin, Carswell, Cruveilhier, and Müller, leading to a difference in the classification of carcinomatous tissues adopted by each. These peculiarities will gradually appear in the following pages, when they are of such importance, either practically or otherwise, as to demand attention. Without further preamble, therefore, we proceed to display tabularly the method according to which, as apparently best in accordance with the present state of knowledge, it is now proposed to treat of carcinoma in general.

It will be seen from the table on the following page, that cancer is synonymous *anatomice* with adventitious heterologous tissue. The fact of its being a tissue, that is, of its possessing structure, separates it unequivocally as a morbid product from others belonging to the same class, for example pus and tubercle. The heterologous material of all carcinomatous formations is organizable, susceptible of vascular development, and hence of undergoing all the changes of increase and decay consequent on such susceptibility. The importance of this feature has been justly insisted on by several writers, but by none more pointedly than by M. Cruveilhier, who remarks, in his emphatic style, that cancerous products are living foreign bodies, which possess vital powers of their own, and, like the fœtus in utero, assimilate materials derived from the individual in whom they are developed, to their own peculiar substance. But in affirming that these growths enjoy a sort of independent existence, in styling them "true parasites and new individuals," this pathologist goes further than he is warranted by observation. An entozoon, however produced, lives without vascular connexion with the parent organism; it is almost needless to state that such is not the case with the class of products now under consideration. — Again, the heterologous character of carcinoma distinguishes it from another section of adventitious growths, the analogous, such as fatty, fibrous, and cartilagi-

nous tumors. In thus applying the term heterologous, we refer to the general appearance of the mass, as seen with the naked eye ; certain opinions of microscopical observers,

Family.	Class.	Order.	Genus.	Species.	Varieties.	Synonyms of the Species.
Adventitious Formations.	Heterologous Formations.	Tissues.	Cancer or Carcinoma.	Encephaloid.	{ Common vascular sarcoma. Mammary sarcoma? Solanoid. Recamier, Zang. Nephroid. Idem. Napiform. Idem. Carcinoma fasciculatum vel hyalinum. Mueller. Fungus hæmatodes. Hey. Hæmatode Cancer. Auct. Gall.	Spongy or ossivorous tumor. Ruysch. Palletta.
						Struma fungosa (testis). Callisen. Spongoid inflammation. Burns. Milt-like tumor. Munro. Medullary sarcoma. Abernethy. Cerebriform disease or cancer. Laennec. Pulpy testicle. Baillie. Carcinus spongiosus. Good. Carcinoma spongiosum. Young. Fungoid disease. A. Cooper, Hodgkin. Medullary fungus. Maunoir, Chelius. Acute fungous tumour. C. Bell. Medullary cancer. Travers. Cephaloma. Hooper, Carswell. Carcinoma medullare. Mueller. Soft cancer. Auct. Var.
				Scirrhus.	{ Pancreatic sarcoma ? Abernethy. Napiform, } Chondroid, } Recamier. Lardaceous tissue. Auct. Gall. Carcinoma reticulare. Mueller.	Carcinomatous sarcoma. Abernethy. Carcinoma scirrhosum. Young. Scirrhous cancer. Travers. Scirrhomia. Carswell. Carcinoma simplex vel fibrosum. Mueller. Stone cancer. Auct. Var.
						{ Pultaceous cancer. Pearly alveolar ditto.

which apparently clash with this use of the word, bear in reality upon a different point.

The genus carcinoma includes the three species already spoken of; and the term is meant to be equally applicable to them in every stage of their existence, before as after softening and ulceration. Each species presents a certain number of varieties. In a column apart are collected the chief synonyms, under which the species have been described by different writers. The comprehension of the works of these authors will, we trust, be facilitated by reference to this list; and the dismay naturally felt by the student on encountering in each new treatise one or more names of diseased formations seemingly distinct from all those he had previously become acquainted with, will be in some measure removed, when he discovers that such diversity of *names* by no means implies a corresponding multiplicity of *things*.

We shall divide the following article into two parts; devoting the first to the subject of cancer in general, in the second describing the disease as it occurs in those tissues and organs in which it is likely to come under the notice of the practical surgeon.

PART I.—OF CANCER IN GENERAL.

§ I.—*Anatomy.*

(a). ENCEPHALOID (from *εγκέφαλος*, *the brain*, and *εἶδος*, *form*). The name of encephaloid or cerebriform tissue was first applied by Laennec to a modification of cancerous growth, of which one of the most striking characters is its resemblance to the substance of the brain. This resem-

blance has been noticed by almost all authors who have written on the subject, but Abernethy was the first, by his adoption of the term *medullary sarcoma*, to make it the basis of nomenclature. We employ the word encephaloid as more convenient and more commonly used.

The section of an encephaloid mass presents, when fully developed, the appearance of an almost homogeneous matter, of an opaque milky color, ordinarily dotted with spots of pinkish hue, varying in different specimens in number, size, and shape. In consistence it closely resembles the healthy brain of an adult, and may be broken up between the fingers with about the same facility as the substance of that viscus; if torn through, the lacerated surface presents a coarsely granular aspect. It has no particular smell; Maunoir states that it has the same odor as the brain, but his senses were probably under the influence of the curious theory he maintained respecting its nature.

Tumors of this kind are found to consist essentially of two elements, — a contained part, the cancerous “matter,” which gives the cerebriform appearance to the whole; and a containing part, consisting of denser septa, which divide the mass into lobes and lobules. These septa rarely appear to intersect each other, but describe curves circumscribing loculi of various shapes and sizes. Though occasionally of fibrous consistence, and in very rare instances even actually cartilaginous, the laminæ composing them are ordinarily of some delicate cellular texture, and have in some cases been compared by observers to a spider’s web.

It is unusual to meet with a tumor presenting these characters uniformly through its whole substance; some portions are commonly harder, others much softer than the matter just described. The variation in point of consistence is marked by a difference in the mode of arrangement of the carcinomatous matter. The hardest part presents a radiated or firmly granular appearance; that of less consis-

tence is largely granular or lobulated; while the softest is collected into large lobes of diffuent pulp. The quantity of pink spots and the opacity of the morbid matter generally increase with its softness. The facility with which the contained cancerous matter is removable from the containing loculi also depends on the consistence of the part examined; when this possesses the density of infant brain, it may be removed by gentle pressure, or by letting a stream of water fall upon it, with as much ease as if enclosed in the cells of a sponge. The expressed matter sometimes preserves the shape of the loculi, and looks like fragments of boiled rice or vermicelli, and a filamentous shreddy locular tissue, the containing basis of the growth, is left behind. When sufficiently firm and adherent to resist this mode of separation, the circinomatous matter may be removed either by maceration, or, as M. Cruveilhier has particularly shown, by cutting the mass into thin slices, and submitting them to the pressure of a machine.

The pink tint of encephaloid is evidently produced by the presence of numerous blood-vessels; its abundant provision in this respect leads to the striking differences between the vital phenomena observable in it and in the other species of cancerous production. These vessels, which vary in diameter from that of a hair to a line and upwards, and appear to the naked eye, to contain florid arterial blood, occur in the form of small isolated striæ in some situations, in others of arborescent patches. The *vascular* character is in some instances distinctly defined, in others ill-marked; in the latter case the blood almost seems as if it had simply been laid on with a brush in minute points and striæ. Small rounded or irregular patches of effused blood are visible elsewhere.

This vascular supply is not limited to the dividing septa of the structure; the vessels may be traced from the cellular substance investing the growth generally, or from the pe-

duncle of a tumor when its attachment to the surrounding tissues is of this kind, seen to ramify into the septa, and from these to plunge into the contained matter. The latter frequently appears, on a section of the tumor, to be the part most abundantly furnished with vessels: in cases of very successful arterial injection the mass appears to be almost exclusively formed of a vascular plexus.

Besides the vessels communicating with external trunks, there are seen in the substance of encephaloid growths small vascular tufts, apparently unconnected with the surrounding circulation, assuming various shapes, of which the most common variety is a single minute trunk, terminating at either end by a number of ramusculi branching off in a stellate form. To these branches, more especially, the remark of Laennec, that the walls of the vessels of encephaloid are very thin in proportion to their calibre, may be understood to apply. The venous or arterial character is a subject of dispute. According to Dr. Carswell they are frequently varicose, and have altogether much more a venous than an arterial aspect; to Dr. Hodgkin, they appear to consist of the capillary vessels of Bichat on a large scale, and their tendency to assume the arterial or venous quality chiefly determined by fortuitous circumstances: Cruveilhier authoritatively affirms that they are veins — an affirmation generalized in the statement, that arteries of new formation are never found in accidental tissues.

The general impression, however, derived either from the aspect of the vessels of encephaloid, or from the results of injection, appears to have been that they were essentially arterial. Until of late no particular inquiry had been made into the condition of the veins of these growths, pathologists being contented with ascertaining that the encephaloid matter may be frequently found in the larger veins on the surface of tumors and traced into the adjoining venous trunks. In 1830, however, Professor Bérard injected with all neces-

sary care the arteries and veins of the neck of a subject who had died with two non-ulcerated encephaloid tumors in that region. On dividing the masses in different directions the usual characters of arterial injection were discovered; but the result as regards the veins was of a very different kind. The capsule investing the tumors presented a venous rete interlacing with that formed by the arteries in the same situation; but the closest search failed to detect a single venous ramuscule or even black point in the substance of the tumor. This failure could only be attributed to the total absence or impermeability of those vessels, for the venous capillaries of the neighboring organs were admirably injected. Further examination explained this curious result by showing that the minute veins were completely obliterated with encephaloid matter. Whether the obstruction is in all cases so complete as in the instance referred to, is a point still open to inquiry; no experimental confirmation of M. Bérard's observation has yet been made public. This anatomist conceives that when such obliteration exists, it is atoned for by a supplementary venous circulation in the adjoining tissues. M. Cruveilhier believes that he has occasionally observed the arterial branches of gangrenous encephaloid blocked up with whitish matter.

Lymphatic vessels have not, so far as we are aware, been particularly noticed in encephaloid. Laennec presumes they do exist in it, from his having observed the adventitious tissue to acquire a yellow tint in an icteric subject; but the presence of lymphatic vessels is clearly not required to explain the circumstance. The only nervous filaments discoverable in this morbid growth are those of the tissues, amid which it is developed; these occasionally traverse its substance in different conditions, to be elsewhere referred to. Maunoir, misled by the physical and chemical characters of encephaloid, by the fact of its development in the tissue of the brain and nerves, and its similarity of constitution to

the growths from, or protrusions of, the brain in cases of hernia cerebri, conceived that it was actually composed of effused nervous substance. This hypothesis does not require serious refutation.

*Microscopical characters*¹. The inquiries of Valentin, Gluge, and Müller on the microscopical elements of encephaloid have led to the establishment of the three following varieties in respect of its intimate constitution.

1. *Encephaloid characterized by predominant formation of medullary matter from roundish formative globules deposited beside the tender fibrous meshes intersecting the mass.* To this class belong, according to Müller, the specimens described by Gluge. The globules observed by this inquirer were variable in size; the smallest measured $\frac{1}{125}$ of a millimeter in diameter². Their form was irregular, but inclining to the circular; their surface uneven, and presenting points and blackish lines beside their transparent edges. Crystals were frequently detected in great numbers; some of them reaching $\frac{1}{8}$ of a millimeter in size; these were possibly, however, cadaveric products. Müller has himself found these globules very like those of ordinary scirrhus and of the gray fundamental basis of one of its varieties, reticular carcinoma. Some points or very minute granules are often discernible in the cavity of these glo-

¹ We trust the abridgment here given of Müller's descriptions will be rendered intelligible by the annexed copies of his engravings (Plates I. and II. ;) some preliminary acquaintance with recent microscopical researches on the development of the ovum and embryonic tissues of animals will much facilitate their comprehension. The appearances detected by the microscope in each species of carcinoma, are stated under the head *Anatomy*; the theory of growth based on these appearances will be found in the section *Physiology*. An explanation of each figure will be found at the end of the article.

² The millimeter is = 0.039370 of an English inch.



FIG.1.

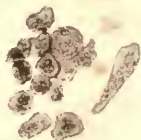


FIG.2.



FIG.3.

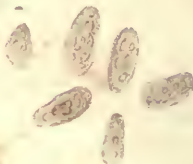


FIG.4.



FIG.5.

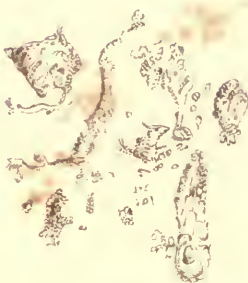


FIG.6.

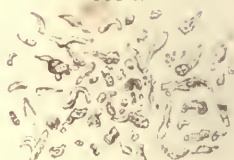


FIG.8.



FIG.7.



FIG.10.

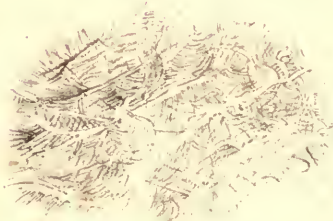
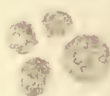


FIG.9.



FIG.11.



bules; with strong magnifying powers a nucleus may frequently be detected in them, just as in the other forms of cancer. These appearances are shown in Pl. I. Figs. 1 and 2.

2. *Encephaloid with an extremely soft brain-like fundamental basis composed of pale elliptic corpuscles without caudate prolongation.* — This variety would appear to be exceedingly rare, as Müller only met with it once in encephaloid of the tarsus. The corpuscles had very little connexion with each other, and constituted, together with vessels, almost the whole mass of the disease. They were from one and a half times to twice as large as the human blood globule. No filament was ever observed issuing from them, or nucleus or young cell in their interior; with an instrument of the strongest power one or more minute dark points only were detected. The aspect of these bodies is shown in Pl. I. Fig. 3.

3. *Encephaloid with caudate or spindle-shaped corpuscles.* — The fracture of specimens of this microscopical variety sometimes present an apparently fibrous aspect, when the caudate bodies follow fixed directions, as in the cases described by Valentin. Müller has seen them in several specimens, either isolated among the roundish formative globules already described, or in numbers, and forming the predominant element. According to the direction in which they are arranged, a radiated or tufted appearance is produced; if their arrangement be very irregular, the fibrous disposition is lost. These differences are exhibited in Pl. I. Figs. 4, 5, 6.

The cavity of these corpuscula contains either a granular body without a clearly distinguishable nucleus, or in other cases a nucleus with one or more nuclear corpuscles. The filamentous or caudal prolongation is observed either at one or both points of the ellipse, and is single or bifid;

in some instances a third filament springs from its side. These appearances are seen in Pl. I. Fig. 7.

Chemical characters. — The chemical reactions of encephaloid, like its grosser physical characters, resemble those of the cerebral substance. Exposed to the action of the air, it gradually liquefies; it is miscible with water and hardens in alcohol and the acids. Lobstein relates some experiments by Hecht, undertaken with a view to establish its intimate composition; the chief result of these was, that gelatine entered very abundantly into the constitution of hard specimens, albumen into that of softened, while fat occurred in neither. Morin, Collard de Martigny, and Wiggers also agree in enumerating gelatine among the constituents of encephaloid: on the other hand, in the subjoined analysis of this morbid product by M. Foy, the most elaborate yet published, not a particle of that principle is noticed; —

Albumen	47.00
White fatty matter	7.50
Red do.	5.35
Osmazome	4.00
Fibrine	6.50
Water	8.00
Oxide of Iron	1.35
Subphosphate of Lime	6.30
Carbonates of {	Soda 2.75
	Lime 4.00
	Magnesia 1.00
Hydrochlorates of {	Potassa 2.70
	Soda 2.00
Tartrate of Soda	0.35

Maunoir had previously ascertained the absence of gelatine in this substance; and Müller, who divides all adventitious growths, in respect of their chemical composition, into three classes; the albuminous, the gelatinous, and the fatty,

ranks cancerous formations with the first, and ascribes the occasional detection of gelatine by chemists to the association of cellular membrane with the matter analyzed. He affirms that, except in one case of encephaloid in the kidney, he never obtained any notable quantity of that principle, even after submitting the morbid matter to twenty-four hours' boiling. Casein was distinctly detected in the same organ. Wiggers discovered phosphuretted fat in this species of growth; Gugert biliary fat (Gallenfette) in a specimen occurring in the eye.

Form.—Encephaloid occurs as a distinct tumor, or is infiltrated into the tissue of organs. Such tumors are either *encysted* or *non-encysted*. The investing cyst, when such exists, is described by Laennec as a smooth membrane, about half a line thick, of a silvery white color, imperfectly transparent, and easily separable from the enclosed mass. M. Cruveilhier refers to a well-marked case of encysted cancer of the liver; here a number of tumors, fluctuating precisely like abscesses, filled with encephaloid detritus of puriform consistence and bounded externally by fibrous cysts, were scattered through the substance of the organ; their cavity was traversed by vessels of various sizes, supported by fibrous tissue. The non-encysted variety is ordinarily spheroidal, but may be flat, oval, or perfectly irregular in shape. A sort of pseudo-cyst, varying in density with the situation of the tumor, is occasionally formed by condensation of the adjacent cellular membrane. The cancerous growth may in these cases be enucleated with the greatest facility. Under this head may be included M. Cruveilhier's form of "disseminated masses," which, though occurring in various tissues, manifests a particular predilection for the liver: in this organ the number of the tumors of various sizes may range between one and several thousands.

The surface of encephaloid tumors is finely mammillated,

botryoidal, or irregularly lobulated; in some instances convoluted like the exterior of the brain. In rare instances, when a true or false capsule exists, the periphery of the tumor is perfectly smooth. Superficial tumors of the liver occasionally present a remarkable cupular depression in their centre: this peculiarity has been attributed to the peritonæum adhering to the surface of the growth when small, and obstructing its central development. We have more than once seen a similar appearance in superficial encephaloid of the lung.

The color of the exterior of cerebriform tumors varies with their state of vascularization; whitish yellow is perhaps the most usual tint, but it is not uncommon to find it either reddish, pink, or generally or partially bluish; all four colors may coexist in different quarters of the same surface.

The *infiltrated* or *diffused* form is that in which the adventitious matter is deposited in the interstices of a tissue, gradually transforming that tissue into a substance identical with itself. This form, very rare in some organs, as for example the testicle, is common in the liver, and is observed where the disease extends by continuity from one tissue to another.

Dr. Carswell's observations on the form in which carcinoma is deposited claim attention. In the earliest stage of the process of transformation, when the cancerous matter is first perceptible, it assumes, according to this pathologist, the form of the elementary physical constituents of the organ in which it occurs. This may be distinctly seen in the instance of the *acini* of the liver and of the fibre of muscle. In other organs, such as the lymphatic glands, brain, and testes, such arrangement of the adventitious substance is not traceable; but this is not owing to its absence, but to the color, homogeneous aspect or minute structure of those parts rendering its detection difficult. At a more

advanced stage of the disease the form derived from the structure of the affected part is lost; the shape of the carcinomatous growth is henceforth *tuberiform*, *stratiform*, or *ramiform*. Dr. Carswell has ingeniously shown the influence of extrinsic circumstances in determining these varieties of shape. But this influence is only occasional; for in some instances the form of a carcinomatous growth can only be explained by inequality of internal development: so, at least, it has appeared to us. When deposited in a situation where it undergoes equal pressure on all sides, the matter assumes a globular shape; when placed in circumstances which facilitate its lateral and obstruct its peripheric development, it acquires a fungiform figure, as is observed where the matter escapes from a dense into a soft tissue, or through an ulceration in the skin. *Stratiform* carcinomatous matter is chiefly met with in the subserous cellular membrane in layers of various extent and indefinite arrangement. It frequently appears in the form of small circular patches, varying in size from that of a pin's head to an inch or more in diameter, is in this state of a creamy consistence and most commonly met with under the pia mater and pleura pulmonaris. *Ramiform*, is the term used by Dr. Carswell to denote the arrangement of the adventitious matter in the veins, lymphatics, and lacteals.

Encephaloid growths acquire a larger *size* than almost any other morbid productions. Abernethy mentions the case of a patient who had a tumor of this description, as large as the head of an adult, in each groin. Such dimensions are by no means uncommonly met with, as the experience of large hospitals teaches. Professor Bérard observed an encephaloid tumor in the thigh of a female, as large as the body of a full grown man. Veins larger than the index finger ramified in the exceedingly attenuated integuments investing it. On the other hand, the opposite

extreme of smallness is occasionally seen, and may be always detected when tumors are in the nascent state.

There is scarcely a tissue or organ in the body, in which encephaloid matter has not been observed, including in this proposition its development by extension from contiguous parts. Thus it presents itself in the cellular, the mucous, the serous, fibrous and synovial, the venous, arterial and lymphatic, the cutaneous, the gingival, the cartilaginous (costal and arytænoid cartilages), the fibro-cartilaginous (nares, pinna, epiglottis), and the ligamentous tissues. We have never observed this morbid matter in tendon or in the intervertebral tissue; but Mr. Travers speaks of its occurrence in the former structure. M. Littré presumes that the articular cartilages, in consequence of their supposed non-vascular character¹, are exempt from the disease; he probably means from its primary development. We have not met any distinct example of the transformation of these cartilages, however, or of the synovial membranes or bursæ². In the osseous tissue encephaloid forms one of the varieties of osteosarcoma; the medullary substance, of the brain frequently, of the nerves more rarely, contains growths of this description; as do also the muscles of voluntary motion, the heart and involuntary muscular tissues generally. Among the viscera it will be sufficient to notice the liver, vesicula fellis and ducts, spleen, pan-

¹ For a luminous discussion of the question of the vascularity of articular cartilage, we beg to refer to the article ARTICULATIONS in the Cycl. of Pract. Surg. Some further observations have been recently made on the subject by two Dutch experimentalists, Professor Sebastian and Dr. Schumer. See Brit. and For. Medical Review, vol. vii. p. 535.

² In the elaborate essay recently published by Bielkiewicz on the anatomy and pathology of the subcutaneous bursæ, no mention is made of carcinomatous disease of these structures. See L'Expérience, Nos. 108, 113, 115, 1839, for a notice of this author's treatise.

creas, kidneys, lungs and bronchi, stomach and intestines, uterus, ovaries, Fallopian tubes, testicles, prostate, and bladder, as the observed seats of this species of carcinoma.

These tissues and organs are not all equally disposed to become the seat of encephaloid growth: the common cellular membrane, the testicle, the liver, and stomach, are perhaps distinguished by the frequency with which this species of cancer originates in them. Particular parts of organs, also, are more liable to be attacked than others; different pathologists have observed that in encephaloid of the stomach, liver, uterus and vagina, the pyloric region, the surface and vicinity of the sulcus umbilicalis, the cervix and the anterior wall are respectively most prone to the morbid transformation. Dr. Carswell remarks that of the tract of small intestine, the duodenum and commencement of the jejunum are perhaps alone subject to the affection; and that in the large intestine it is exclusively confined, when primary, to the sigmoid flexure and ileo-cæcal valve: but the rectum furnishes an obvious exception to the latter statement. Double organs are not often simultaneously affected.

The nature of the tissue in which the cerebriform *mass* originates, affects, in some instances, the phenomena of its growth and composition. Thus when the disease springs from bone, it is not unusual to find inammillary osseous vegetations, spiculæ, or lamellæ projecting from the normal tissue into the heterologous formation: these sometimes constitute a solid stroma for its deposition. The cancerous *matter* is not, however, in these cases altered in nature or properties.

Parts in a state of chronic induration are not exempt from the occurrence of cancerous infiltration. The inodular tissue of cicatrices following the removal of carcinoma, and, as it would appear from a few well authenticated facts,

pseudo-membranes formed on the free surface of serous tissues, are likewise capable either of undergoing encephaloid transformation, or of forming the basis, whence fungating growths of this character may spring. Among accidental productions, erectile tumors (*nævus maternus*, aneurism by anastomosis, &c.), are peculiarly prone to become the seat of encephaloid formation; hence, no doubt, arose the confusion that long prevailed, particularly in France, in the application of Hey's term, *fungus hæmatodes*; it was indifferently used in speaking of fungating encephaloid and the disease now referred to. By Dr. Hodgkin this striking feature in the pathology of adventitious erectile tissues, is ascribed to their low vitality; by Walther and Recamier to persistent irritation from internal and external causes: both notions are purely hypothetical. Multilocular cysts, as observed in the ovary and mamma, frequently contain in some part of their walls encephaloid vegetations, or masses.

Certain adventitious structures have been declared incapable of becoming the seat of carcinoma. Bayle and Lobstein affirm that fibrous tumors are thus characterized: Dupuytren formally denies the correctness of their opinion.

The number of parts affected in one subject varies very considerably: though it is comparatively rare to find this species of cancer limited to a single organ, more especially if the disease have been in existence for any length of time before death, yet such occurrence is by no means unestablished by experience. In other cases a vast number of organs, and in every conceivable variety of combination, are found to be the seat of the disease. M. Velpeau's celebrated case supplies the most marked illustration of multiple development with which we are acquainted: in this instance the common cellular membrane, the muscles and bones, the lungs and heart, the tissue between the costal

pleura and ribs, the stomach, duodenum, and small intestines, the pancreas, kidneys, liver, vena cava, and coats of the gall-bladder, the peritonæum, dura mater, and the thyroid gland, were all in various degrees affected with the disease.

Varieties. — Under the title of *common vascular sarcoma*, Abernethy included “such tumors as are organized throughout, but without any distinguishable peculiarity of structure.” The description given of these tumors is vague enough, yet sufficiently clear to show that lobulated encephaloid, firm and unsoftened, was probably the structure which our great surgeon had in view.

The tumor designated by the same observer, as *mastoid or mammary sarcoma*, is still more difficult of identification; Dr. Carswell, however, considers the term to refer to cases in which the carcinomatous substance is uniformly disseminated through the texture of an organ.

M. Recamier gives the names of *solanoid* and *nephroid* to hard, scarcely elastic encephaloid, possessing the appearance of a section of a potato or the kidney. The justness of this comparison may frequently be seen¹. When the fibrous intersections are distinct, broad and fascicular, the divided mass has more the appearance of a cut turnip, and is therefore called *napiform* by this pathologist. This latter condition is, however, much more frequent in true fibrous tumors.

Under the name of *carcinoma fasciculatum vel hyalinum*, Müller describes that rare form of encephaloid in which a fibrous or linear arrangement coexists with softness. Tumors of this description tear in the direction of the fibres;

¹ Tumors of the *solanoid* description have sometimes a fatty unctuous look on division, and are almost perfectly homogeneous, (neither fibre nor vessel being usually visible with the naked eye,) and of light yellowish color.

in this differing from common encephaloid. They are frequently, nevertheless, lobulated externally and internally, and are sometimes transparent like jelly. The fibres follow no fixed arrangement; they are usually pale and transparent, whence the term *hyalinus*, vitreous. This is not a constant character however. Examined under the microscope, this growth presents neither the cell-globules of the other sorts of carcinoma, nor the caudate corpuscles of apparently fibrous encephaloid. From the transparency of the fibres under the instrument, they require to be examined in deep shadow; their surface is studded with granules. The character of the fibre is seen in Pl. I. Fig. 8. It is probable, according to Müller, that this variety is nothing more than carcinoma reticulare (a form of scirrhus to be presently described) in a soft condition. It seems allied to the nephroid cancer of Recamier.

There are two conditions under which the relation of the encephaloid matter to its vessels or their contents is productive of appearances which have led to the application of particular names to the disease. 1. When interstitial hæmorrhage leads to sanguineous infiltration of the mass or irregular accumulations of blood, and when, especially after ulceration of the integuments, a rapid development of fungating growths takes place from its substance, the disease, in imitation of one of its earliest describers, Hey, is termed *fungus hæmatodes*. The circumstances under which this name is applicable are, however, merely fortuitous, and do not imply any fundamental distinction in the nature of the growth exhibiting them. If (inasmuch as the changes to which it refers materially affect the local and general pathological influence of the morbid formation) this name be retained for practical purposes, it should be strictly limited to the disease when in the state described: as a general term for the species, it is strongly objectionable; nor, strictly speaking, can fungus hæmatodes be considered a

variety. 2. This term has also been applied in cases where an abundant vascular and erectile rete forms a striking constituent of the growth (Dupuytren); but this state is by some designated as *hæmatode cancer*.

(b.) SCIRRHUS. (From *σκιρῶς*, which from *σκιρός*, a piece of marble.) Galen used the term scirrhus as a synonym of *σκληρώμα*, hardness; and it appears to have been applied by him and his successors to all tumors possessing this character. At an early period, however, it was limited to diseased induration, of which the essential peculiarity is to terminate in intractable ulceration. It is hardly necessary to add, that it is here used in the latter acceptance¹.

If a section be made of a scirrhus tumor while in the stage of induration, the existence of a containing and contained part is immediately recognised. The general color of the cut surface, or, more correctly speaking, of that portion of it formed by the contained element, is grayish, or bluish white, in rare instances greenish, reddish, or deep-brown, but under all circumstances presenting a glossy and peculiar semi-transparent aspect: the latter character is best seen by examining a thin slice of the substance. The containing tissue, formed of bands of fibrous appearance, which are easily distinguishable from the matter they enclose by their greater opacity and their inferior glossiness, vary considerably in their mode of arrangement. In some instances they form spheroidal cells; in others a rectilinear disposition predominates; in others they appear to radiate from a central fibro-cartilaginous nucleus to the periphery of the tumor. The proportion of surface occupied by the cancerous matter and the intersecting

¹ In this sense we also use the adjective *scirrhus*. Probably the mal-application of no single word has led to more serious confusion than of this adjective, which is by many writers applied indiscriminately to all *hard* structures, though they rigidly confine their use of the substantive to a particular form of carcinoma.

lamellæ varies greatly. The former is commonly most abundant, the septa constituting simply delicate partitions; but in the early stage of the disease, especially in dense organs, a firm, pale, compact, cellulo-fibrous tissue (chondroid of Recamier) is not unfrequently, as Dr. Carswell observes, the only anatomical element to be distinguished: there is now no distinct appearance of septa; but as the disease advances, the secretion of true cancerous juice grows proportionally active, and the locular character is developed. The septa of scirrhous frequently stretch beyond the tumor into the surrounding cellular tissue.

One of the chief characteristics of this species of carcinoma is its extreme hardness; in this respect it often exceeds cartilage, and there is hardly any exaggeration in the vulgar term stone cancer. As a general measure of consistence, the intervertebral fibro-cartilages are perhaps the best. The degree of induration in the actually hard part of a tumor is very equal throughout; but there are frequently scattered through its substance one or more small masses of homogeneous pulpy matter, of yellowish brown color, semi-transparent, slightly glutinous, and altogether closely resembling apple-juice. The transition from hardness to complete pulpiness is usually sudden, the stratum immediately adjoining the softened matter possessing the full share of density existing elsewhere. The degree of adhesion of the enclosed matter to the fibrous septa, though variable, is always considerable. By forcible pressure a thin albuminous fluid may be made to exude from a slice of the tumor; this is the scirrhous juice or ichor. The importance of its presence as a diagnostic sign of scirrhous is indubitable; M. Cruveilhier goes so far as to affirm that it forms the only distinction (visible with the naked eye) between some tumors in the bones really belonging to this class, and others merely fibrous.

It is commonly impossible to discover with the naked eye

any vascularity in an uninjected scirrhus mass. Delpech is stated, as something extraordinary, to have shown some capillaries running a few lines into a tumor. Scarpa even affirms that no matter how fine material be employed for injection, none can be forced into the morbid growth itself — that the principal arterial trunks of the diseased organ only are filled. Mr. Travers and Lobstein write in a similar strain. Dr. Carswell states that blood-vessels are rarely perceptible; and that such as are discoverable really belong to the normal tissues enclosed within the heterologous substance. Cruveilhier on the other hand maintains, that, in spite of this tenuity, vessels may be recognised with a little attention; while Müller expresses his astonishment that authors should have represented this structure to be without them, and declares he has never failed to discover them on accurate examination. Independently of *à priori* views, we are disposed to agree with the last named observers from our own experience: we have occasionally seen injected specimens of undoubted scirrhus, in which an obscure rosy tint from abundant punctuation was plainly perceivable.

No attempt has, so far as we are aware, been made to investigate the relations of the venous, lymphatic, and nervous systems to these tumors.

Microscopical characters. — Passing over the observations of Everard Home on this subject, which are too fanciful to require particular notice, we come to the recent inquiries of Müller. In some specimens of scirrhus of the mamma examined by this anatomist, white canaliculated filaments containing a colorless, whitish, or yellowish matter, were seen scattered through the mass. These hollow filaments appear to consist of lactiferous ducts and lymphatic vessels with thickened walls; they are not found in non-glandular parts. They are represented in Pl. I. Fig. 9.

The mass of the scirrhus consists of a fibrous and a

granular substance. The former constitutes the bed in which the latter is deposited, and cannot generally be distinguished until the granular element has been scraped away or removed by maceration; it then exhibits the appearance seen in Pl. I. Fig. 10. The remaining matter, of gray color, consists of loosely-connected microscopical formative globules, or transparent hollow cells or vesicles measuring from $\cdot 00045$ to $\cdot 0012$ of a Paris inch in diameter, and insoluble in cold or boiling water, and in acetic acid. In many of these cells some points resembling minute granules are alone to be recognised, (Pl. I. Fig. 11, and Pl. II. Fig. 1.); in others one or more good sized corpuscles, like nuclei or smaller vesicles, are perceived, and each of these corpuscles or germinal cells is itself supplied with a minute opaque nucleus, as is seen in Pl. II. Fig. 2.

Chemical characters. — Morin, Collard de Martigny, and Hecht, have examined the chemical constitution of scirrhus, and the two latter chemists published quantitative analyses of some specimens. All three agree in enumerating gelatine among its elementary principles. The following analysis is by Foy : —

Albumen	42.00
White fatty matter	5.00
Red ditto	3.25
Fibrine	5.85
Water	5.00
Oxide of Iron	1.65
Subphosphate of Lime	16.60
Carbonates of { Soda	5.00
{ Lime	6.60
{ Magnesia	0.85
Hydrochlorates of { Potassa	4.10
{ Soda	3.25
Tartrate of Soda	0.85

FIG 1



FIG 2



FIG 3



FIG 4

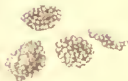


FIG 5



FIG 6

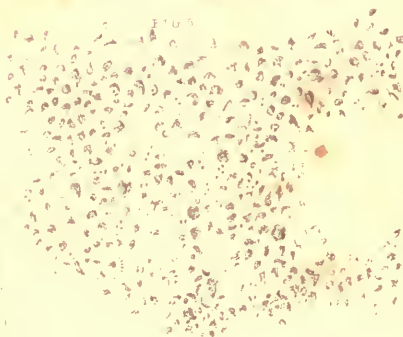


FIG 7



FIG 8





Compared with the analysis of encephaloid by the same chemist, the chief peculiarities here are the less quantity of albumen and fibrine, the absence of osmazome, and the much higher proportion of inorganic salts: no gelatine occurs in either case. Müller's observations confirm their accuracy in this latter particular: after repeated examinations of mammary scirrhi, and boiling them for 18 or 24 hours, he only succeeded once in detecting gelatine. Casein he discovered in the reticular variety, and considers it a very uniform constituent of carcinoma of the breast; but that its presence in this gland does not depend on the contents of the remaining fragments of the lactiferous ducts is shown by its entering into the composition of the disease in other organs.

Scirrhus is either developed in the form of a tumor or is infiltrated in the substance of organs. Scirrhus tumors are usually rounded or oval, and flattened; their external surface smooth in the outset, lobulated and anfractuous in the more advanced stages. The latter disposition is most strongly marked, when the disease has originated in a single point; the former when the total mass is composed of several minor growths. We have never observed them invested with a true cyst; the statements of Dupuytren, Recamier, and others, seem, however, to be conclusive of its occasional existence. The infiltrated form is not unusually met with in some organs. Of five cases of cancer of the brain described by Andral¹, two were of infiltrated scirrhus. In the uterus this mode of deposition of the carcinomatous matter is much the more common; it attacks the bones too, in them gradually producing softening, while it indurates the soft parts — a striking illustration of the assimilative power of the morbid growth; in each instance it alters the consistence of the part to its own standard.

¹ Clinique Médicale, t. v. p. 633, et seq.

Scirrhus tumors very rarely, if ever, acquire large dimensions; they seldom exceed an orange in size. This character helps to distinguish them from fibrous growths.

Scarpa believed that scirrhus is never produced primitively in any other situation than the external conglomerate glands, in the skin, and in certain viscera invested by the mucous membrane. With the first class he ranks the mamma, the parotid gland, the testicle, the submaxillary, and lachrymal glands; with the second the œsophagus, the rectum, the vagina, the neck of the uterus, and the larynx. He maintained that scirrhus never occurs primitively in the lymphatic vessels or glands, in the sublingual glands or tonsils, or in such viscera, properly so called, as have not been included in the enumeration just made, although some of them are invested with a mucous membrane. Numerous English authors write, though less definitely, to very much the same effect. Mr. Travers limits the occurrence of scirrhus "to some or other description of secretory texture." But the more recent investigations of accurate observers at home and abroad (Velpéau, Hodgkin, Carswell, Cruveilhier, &c.) have proved the error of such doctrines. Cancerous tissue, possessing all the characters of scirrhus, occurs in the bones, the voluntary muscles, the liver, the lungs, the brain, and has been met with in the substance of the heart. On the whole the seat of this species of carcinoma appears scarcely more limited than that of encephaloid.

Scirrhus is ordinarily solitary; in some instances, however, growths of this species have been observed in several organs in the same subject. The female mamma, the uterus, the stomach, and the lower lip are the parts of the body most frequently attacked.

Varieties. — The *pancreatic sarcoma* of Abernethy is set down as a variety of scirrhus by Dr. Carswell, the peculiar appearance resembling the tissue of the pancreas being

ascribed to a lobulated arrangement of the scirrhus matter : by Dr. Hodgkin it is supposed to refer to "non-malignant tumors composed of compound serous cysts:" according to Chelius the pancreatiform and mastoid tissues are nothing more than accidental modifications of encephaloid : Professor Bérard, after a diligent study of Abernethy's essay, declares himself unable to determine to what description of structure the term was applied. Our own conclusion on the subject agrees with that of the latter writer. Abernethy refers to a tumor, possessing vessels, $7\frac{1}{2}$ inches in length, $3\frac{1}{2}$ in circumference, weighing two pounds and a half, and developed under the ocular conjunctiva, as an example of pancreatic formation ; now the seat, bulk, and other characters of this mass appear tolerably strong evidence that it was not of true scirrhus nature. Müller speaks of an encephaloid tumor of which the innumerable small component lobules gave the mass a pancreatic appearance ; some of Cruveilhier's figures of pultaceous areolar carcinoma bear no distant resemblance to the structure of that viscus : as far as our experience goes, the term is more applicable to either of these species of cancer than to scirrhus.

M. Recamier terms this morbid formation in its earliest stage *chondroid* : the consistence of the substance is then very closely that of cartilage, its section shining, and of blueish-white color.

In perusing the works of French pathologists much difficulty is felt in determining to what growths they apply the phrase *lardaceous tissue*, or rather the conviction arises that they thus designate all morbid productions of every class possessing an accidental resemblance to the boiled rind of bacon. Now scirrhus, when infiltrated in the substance of organs, frequently assumes this appearance. In this manner Andral speaks of the tissue of the brain being "transformed into a lardaceous tissue possessing all the

characters of scirrhus." The term is a useless addition to our already over-loaded nomenclature.

Under the title of *carcinoma reticulare* Müller describes that form of scirrhus in which a reticulated appearance of the fibrous intersections is particularly manifest. This condition of the septa announces, according to Müller, other peculiarities in the scirrhus growth. Tumors of this description attain a larger size and have a greater tendency to lobular arrangement than simple scirrhus; their consistence ranges between that of ordinary scirrhus and encephaloid. The greater number of cancers of the female mamma are of this description; Müller has also seen it in the stomach, axillary glands, lip, orbit, anterior mediastinum, and in small masses on the surface of the heart. So far we can perceive nothing really novel in the description of *carcinoma reticulare*; its microscopical characters, however, appear peculiar. It consists fundamentally of a grey globular matter, embedded in meshes formed of fibrous fasciculi, which are represented in Pl. II. Fig. 3, as they appear after the removal of the globules. Its globular structure seems the same as in ordinary scirrhus, the globules containing subcells, nuclei, or granules; minute unattached granules are occasionally seen in great numbers between the vesicles, the smallest of them endowed with molecular movement. The cell-globules measure $\cdot 00021$ to $\cdot 00040$ of a Paris inch in diameter. The reticulated figures are not formed of enlarged vessels with thickened walls, as is occasionally seen in simple scirrhus, but produced by the inlaying of white granules in the grey mass. These granules are not cellular, but apparently formed of an accumulation of opaque sub-granules. Their appearance under a magnifying power of 450 diameters is shown in Pl. II. Fig. 4. They are generally roundish or oval, and from twice to four times as large as the globules of the blood. Their mode of arrangement producing the

reticulated figures is shown in Pl. II. Fig. 5: they are magnified 100 times and seen by transmitted light.

(c.) COLLOID. This term, derived from *κollōides* (from *κόλλη*, *glue*, and *εἶδος*, *form*,) was first applied by Laennec to a heterologous product, one of the most striking peculiarities of which consists in the gelatiniform character of its contained element. A tolerably accurate description of this morbid product was also given in 1816 by Otto, and an illustrative engraving in his "Beobachtungen" conveys, though in a rough manner, its characteristic features: the disease, which occurred in the stomach, was described as scirrhus of that organ.

The section of a colloid growth presents an appearance, which once seen can scarcely be forgotten. The surface is divided into a vast number of distinct alveoli regularly arranged, of an oval or rounded shape, varying in size from that of a grain of sand to the largest pea. The septa composing the walls of these loculi possess distinctly fibrous characters; their thickness is pretty uniform throughout, occasionally, however, they are broader in some situations than in others; in this case the thicker septa may generally be found to give off productions forming the walls of secondary loculi, and these again others, constituting a tertiary order. The loculi sometimes form shut sacs, in other instances communicate with the circumjacent cells; it is not very unusual to observe alveoli of which the walls seem to have collapsed and coalesced from the removal of the contained matter. In point of consistence a colloid mass, of which the loculi are perfect, usually resembles firm cheese, but may be much harder; the general color of the divided surface is greenish yellow. The latter is more especially the case with the contained matter, which is, besides, semi-transparent, tenacious, and clammy, and resembles in respect of density, as in other physical properties, soft jelly. It is not easily expressible from the

containing loculi, but may be picked out with the point of a scalpel, or removed by maceration.

A remarkable character of this structure, so long as the process of destruction has not set in, is, that whatever or in whatever form it be developed, the appearance and properties of its constituent elements are exceedingly uniform in every part of its surface; the firmness, transparency, and other qualities of the tissue are as distinctly marked towards the centre as the periphery of the mass. The peculiar uniformity which sometimes exists in the size of the alveoli is well shown in a figure of the disease as occurring in the cranial bones and pituitary membrane, copied from Cruveilhier's twenty-first Fasciculus.—(See *Cancer of the Meninges*.)

In a specimen of the disease affecting the stomach, we recently noticed the following particulars:—The morbid matter occupied about one-third of the posterior surface of the organ, terminating at about half-an-inch from the pylorus and formed an irregular globular elevation somewhat more than half-an-inch high (exclusive of the coats of the stomach), two broad, and two and a half wide. Over by far the greater part of its surface, which was irregularly mammillated, and of a greenish yellow tint, the morbid matter was uncovered, and exhibited its characteristic alveolar and jellylike aspect. But on the confines these characters were only seen in some spots, where destruction of the investing mucous membrane had taken place: this destruction seemed to consist in a simple wearing out from gradual attenuation; there was no hardening or elevation of the borders of the small perforations thus produced, nor had they the appearance of ordinary ulcers. Surrounding this mass, on its cardiac border, was an elevated flabby formation, more than half-an-inch high, and three lines thick in some places, with the feel of a piece of lung condensed by simple pressure. On making a section of this production, the colloid

tumor and the coats of the stomach, the following were found to be their condition and mode of relation. The peritonæum was everywhere traceable, and in some parts considerably thickened; the muscular tunic, of a pale yellow-green tint, varied from one-eighth to a quarter of an inch in thickness: the major part of the colloid mass lay on the gastric surface of the cellulo-fibrous membrane, to which it adhered closely; in one or two points of its periphery the diseased structure penetrated, as it were, through this membrane and the muscular coat down to the peritonæum, along the inner surface of which it then spread for about half an inch. Where the mucous membrane existed entire over the colloid structure, it could be dissected from off the latter without injuring the cancerous cells — a fact showing that the morbid matter was here developed between the cellulo-fibrous and the mucous tunics. But the colloid alveoli also extended, gradually decreasing in closeness and number, into the elevated production already referred to: this seemed itself to be nothing more than a hypertrophous state of a fold of the mucous coat, accompanied with flabby induration; it had neither the structure nor the consistence of any form of indurated carcinoma, and its gastric surface was perfectly sound and apparently healthy. Hence it appears that the mucous membrane, previously rendered hypertrophous, may, as well as the cellulo-fibrous and mucous tunics, become the nidus of the diseased formation. M. Cruveilhier has made a closely similar observation, for he remarks that the fungous vegetations, observed in the substance, or on the confines of gastric colloid, are mucous papillæ prodigiously enlarged. According to Müller the development of the gelatinous cells is coeval between the fasciculi of muscular fibres and in the mucous tunic: in the earliest stage of the disease the cells are only visible with the aid of the microscope.

Little has yet been done in investigating the vascular

condition of colloid. Cruveilhier says that both arteries and lymphatics in a permeable and healthy state are found between the alveoli of the diseased mass; the cells he considers formed of dilated veins. When the disease has reached its maximum development, no trace of vessels is, according to the same observer, discoverable. Müller speaks of a case in which the cells were invested with a distinct vascular membrane, but is silent respecting the character and mode of distribution of the vessels. Velpeau injected a colloid tumor of the shoulder before removal from the body, and observed vessels, "presenting nothing remarkable," in its septa. Andral is not aware that vascular twigs have ever been traced into the jellylike matter itself.

Microscopical characters. — According to Müller, when the minute cells of colloid structure are examined under the microscope, they are observed to contain several more minute cells enclosed within them, and again these secondary cells a tertiary order of still smaller dimensions. An opaque yellow parietal nucleus is easily seen in the smaller cells; and many of the latter also contain free nuclei in their interior, as cytoblasts¹ for the development of future cells. (Pl. II. Figs. 6 and 7.) The largest cells have distinctly fibrous walls, and the fibres pass from one cell to another, as is seen in Pl. II. Fig. 8. Müller observed, in two instances, acicular crystals in the jelly of preparations preserved in alcohol; and in one case caudate bodies similarly situated. In order to distinguish the encasement (*einschachtelung*) of the cells and their relation to the nuclei, it is necessary to examine the disease in the earliest stage of development.

Chemical characters. — The jellylike matter of colloid retains its transparency in preparations preserved in spirits

¹ From *κύτος*, a cell, and *βλαστός*, a germ.

of wine. Müller was unable to discover any trace of gelatine in the expressed jelly, when carefully freed from membranous tissue. A tumor, removed from alcohol, was boiled for eighteen hours, and at the end of that time had only yielded a very small quantity of matter, which though somewhat allied in properties to the salivary principle, was in truth *sui generis* and could not be precipitated by any reagent, not even by tannin: its existence was established by evaporation of the fluid in which the mass had been boiled. When tumors, which have been long kept in spirits, are operated on, they are found free from osmazome; this principle must be first carefully removed, when fresh specimens are made the subject of analysis. No casein is found in the jellylike matter. Cruveilhier likewise ascertained that the contained matter yielded albumen only in the ordinary specimens of the disease; but in the remarkable instance of the pultaceous variety already referred to, the contents of the cells, submitted to analysis by M. Boutin-Limousineau, were ascertained to consist of casein.

Colloid presents itself as a distinct solitary tumor, or in numerous small masses disseminated through the substance of an organ, or the morbid matter is infiltrated in the tissues affected. When occurring in the form of a *tumor*, it is sometimes surrounded with a pseudo-capsule consisting of condensed cellular tissue, in some cases of such tenuity that the character of the subjacent substance may be partly distinguished through it. The external surface is lobulated. *Disseminated masses* of colloid structure are met with in the greater and lesser omentum, as an extension of the disease from the stomach; they vary in size from mere granulations to tumors of moderate size; two or more occasionally coalesce into a single mass. The *infiltrated* form is of most common occurrence in the stomach, and is likewise met with in the omentum. The former viscus

retains its natural shape when thus affected, though its cavity is much diminished in size from the occasionally extreme thickening of its walls; when the latter condition is carried to its greatest extent the organ does not collapse when removed from the abdomen.

Colloid growths acquire considerable bulk: there is a formation of this species as large as a cocoa-nut, and connected with the omentum, among the preparations in the collection at King's College. In the infiltrated state it sometimes extends over upwards of two-thirds of the anterior and posterior surfaces of the stomach, as in Otto's case; according to Cruveilhier, in a good proportion of instances of destruction of the entire surface of that viscus, the disease exhibits the present form of structure. Velpeau has seen masses, weighing several pounds, in the extremities.

According to Cruveilhier, colloid is the form of cancer most frequently met with in the diseased condition of the bones termed osteo-sarcoma and spina-ventosa: he has, besides, observed it in the uterus, ovary (?), at the lower extremity of the rectum, in the cæcum, the small intestine, and the omentum. It has, however, appeared to him (and here his experience coincides with that of other observers) to occur most commonly in the stomach, and, like other cancerous structures, to affect, more particularly, the pyloric region. The specimens of this species of carcinoma which have fallen under the notice of Dr. Hodgkin were all situated in the abdomen, either attached to or seated at no great distance from the alimentary canal, and usually in the neighborhood of the stomach and rectum. This pathologist, however, further informs us that it is not very uncommon in connexion with tendon or bone. He endeavors to explain the predilection the disease appears to affect for the alimentary canal, on the principle that the products of the disturbed nutrition of a particular part are liable to be modified by the structure of the surrounding natural tis-

sues ; — the regular production of mucus on the surface of the digestive tube is thus supposed to influence the character of the contained matter of the cancer. M. Cruveilhier, on the other hand, ascribes the comparative frequency of this form of affection in the stomach to the great tendency of that organ to carcinomatous disease in general. This is a less hypothetical mode of accounting for the fact, and evidently better reconcilable with the occurrence of colloid in parts unconnected with the mucous secretions. There is an excellent specimen of the disease in the mamma, referred to by Müller, in the collection at St. Thomas's Hospital. Professors Bérard, Velpeau, and others, have observed it in the extremities ; and it appears to occur with tolerable frequency in the shoulder and upper part of the arm. The museum at Guy's contains a preparation of the disease in the testicle.

In describing a specimen of reticular carcinoma (scirrhus), Müller states that he found in its substance a mass of alveolar colloid as large as a hazel-nut ; and adds, that he has more frequently seen this form complicated with simple scirrhus. Such association of these two species of cancer is nevertheless, we apprehend, rare ; no example of it occurs in the museums of the metropolis. It is important that the homogeneous jellylike pulp frequently seen in the interior of scirrhus, and which is nothing but its own substance softened, should not be confounded with true alveolar colloid ; the latter not unfrequently exists in the same tumor with encephaloid.

In the description of scirrhus, the comparative rarity of the co-existence of several tumors in the same subject has been noted ; this is still more marked in the case of colloid. M. Cruveilhier states that it is rare to observe its successive or simultaneous development in a number of organs or parts. Dr. Hodgkin expresses himself nearly in the same tone, but adds, that it does at times invade different locali-

ties in the same subject. It may coexist with the two other species of carcinoma in distinct organs. In the case of the disease in the stomach already adverted to, the left ovary presented a solanoid mass, and the cervix uteri was infiltrated with scirrhus.

Varieties. — One of the distinguishing attributes of this species of cancer is its apparent insusceptibility of assuming such variation of internal arrangement, as to call, in this point of view, for the establishment of varieties; but the properties of the contained matter are not always the same; instead of being simply jellylike, it may be perfectly transparent and almost white, constituting the alveolar cancer *à matière perlée* of M. Cruveilhier. This substance is represented to be tenacious, yet without adhesion to the containing cells and easily enucleated: the contents of each cell resembling “a small pearl of the finest water.” Or the contained material may be opaque, of yellowish hue and tallow-like aspect, with granular fracture and feel, and the chemical constitution of caseum. Under these conditions it has been met with in the bones, uterus, vagina, and walls of the urethra, and constitutes the *areolar pultaceous cancer* of the same pathologist. These modifications are comparatively unimportant, while the fundamental alveolar character is preserved.

§ 2. — *Physiology.*

We propose examining under this head some of the phenomena influencing and attending the evolution of carcinoma, — the circumstances of its origin, growth, and decay. We shall consider the different species together, in order to avoid the repetitions which, on account of the similarity of their physiological processes, a separate examination of each would unavoidably entail.

(a.) ORIGIN. — It is unnecessary to review all the hypothe-

ses brought forward at different times respecting the seat and origin of cancerous matter; the majority of these are either so *prima facie* absurd, or so repugnant to the results of sound observation, that they are only fitted to figure among the curiosities of medical literature. The reader may well be spared an inquiry into speculations ascribing cancer to the atrabilis or a melancholic humor — to lymph converted into an acrid and destructive fluid — to the presence of a gas possessing properties analogous to those of hydrosulphuric acid — to fluids spontaneously effused and rendered corrosive by putrefaction — to a depravation of the nervous fluid — to “insects or the germina of these taken up from the air by the lymphatic vessels¹” — or to a virus composed of an ammoniacal fluid containing oxide of nitrogen in excess. Nor is it advisable in a work of this kind to do more than mention the theories of Dr. Adams, who supposes carcinoma to be the result of the generation, growth, and multiplication of a particular entozoon (the “*hydatis carcinomatosa*”); of Dr. Baron, who likewise attributes the diseased formation to hydatids, but denies its “animalcular existence;” or of Mr. Carmichael, by whom cancer is regarded as “an animal fungus possessed of independent vitality.” Such doctrines only shall be particularly noticed as are remarkable for their influence on general opinion or their speciousness.

Pouteau professed that the disease is primarily induced by a mechanical lesion of the affected parts. He conceived that this injury, a blow for example, necessarily leads to the extravasation of blood and other vascular fluids; that the effused blood liquefies, acquires acrid properties, irritates the circumjacent nervous filaments, and thus originates

¹ Justamond (p. 65) quotes a thesis by Martin Schumacher and the work of Quadrio to show that he was far from singular in entertaining this opinion: the latter had seen the insect, and describes its length, breadth, and color.

a growth which in process of time becomes dense and voluminous.

Hardly differing from this fundamentally is the notion taught by Abernethy, that deposition of the coagulable part of the blood is the first step in the formation of all adventitious structures. This extravasation might, he conceives, be the effect of an accident, or of a common inflammatory process, or of diseased action of the surrounding vessels, and take place either in the cellular tissue, in the parenchyma, or on the surface of organs. The subsequent development and increase of this matter, when once organized, he believed to depend on its own inherent powers and upon actions maintained in itself. It is now understood that effusion of blood does not necessarily precede the formation of tumors, and hence that Abernethy's theory is untenable.

In 1815 C. Wenzel undertook to prove that scirrhus and induration were one and the same thing, and carcinoma nothing more than inflammation of indurated parts. If Broussais be believed, cancer is a result of acute or subacute inflammation, and the progress of the former is always in the ratio of the intensity of the latter; external cancer is the product of an irritative degeneration of the tissues in which fat and albumen abound. Similar notions were entertained by Breschet and Ferrus: these writers maintain that cancer invariably succeeds irritation or inflammation, and is incapable of being developed, unless in situations where either of those states has pre-existed. Inflammation, they allege, leads to the effusion of coagulable lymph (fibrine), or of a strongly concrescible albuminous liquid into the cellular element of the tissues; the effused matter is, according to circumstances, either absorbed or remains as an indurated mass tending to disorganization. Scirrhus they, like Wenzel, consider identical in nature with the indurations or callosities, which occasionally form on the confines of wounds and fistulæ. The sophistry of the

system of argument by which the doctrine of irritation is upheld is notorious; but the facts, that simple induration is a state distinguished by its inactivity, while scirrhus possesses in itself an active principle of increase and growth; that carcinoma assimilates to its own nature the tissues it attacks, while inflammatory induration is modified by the particular structure affected; furnish a better refutation of it than any critical exposure of its fallacies. The former important result of clinical observation is confirmed, while it is explained, by microscopical investigation; the materials exuded in simple induration never contain any cell-globules provided with germs of young cells; in carcinoma, on the contrary, an inherent power of growth is produced and maintained by the formation of globules containing in themselves the embryos of a secondary crop of similar bodies. (Müller.)

From this error the disciples of the eclectic school easily steered clear. M. Andral, reflecting on the impossibility of producing any form of carcinoma by exciting even the most intense degrees of inflammation in the tissues of animals, on the frequent formation of that substance, where no local or general symptom of irritation has preceded its appearance, and on the far from uncommon presence of cancerous masses in the midst of tissues possessing every characteristic of the most perfect health (*e. g.* in the lung and liver), had no hesitation in rejecting the doctrine of Broussais. He admits, as all will do who have had opportunities of satisfactorily ascertaining the early condition of the diseased part, either by direct observation or through the testimony of intelligent patients, that irritation sometimes precedes and appears to act as the local exciting cause of the growth of the morbid structure; but to this occasional influence he limits its power. M. Andral believes that every agency, which modifies the processes of

nutrition and secretion, tends to give rise to the formation of adventitious matter in the cellular structure of organs.

Some years since our distinguished countryman Dr. Hodgkin endeavored to show, by a train of very ingenious and plausible reasoning, that the production of cancerous growths depends on the presence of simple or multiple cysts. "If," says this anatomo-pathologist, "we carefully dissect down to the surface . . . of a tumor, in which the progress of decay has either not commenced or has made very little progress, we shall find that the surface, which is next to the mass of the tumor, is more or less smooth and even: and on raising *it*, we find that it is reflected over one or more somewhat pyriform bodies, attached by a base, which is generally narrow and peduncular, to some part of the circumference of the enclosing capsule. . . . It must be sufficiently obvious, that the appearance presented by the section of a tumor such as I have just described must be very materially affected by the direction in which the section is made. If it pass through or near to the point at which the pyriform bodies are attached to the enclosing cyst, it must more or less nearly correspond with the direction which some of these bodies take towards the circumference; and their edges will consequently be seen in the form of radiating lines. On the other hand, if the section be made more or less nearly transverse to the axes of these bodies, their sections will convey the idea of cells of various shapes. If, continuing the dissection, we raise the outer cyst, or the membrane reflected from that which covers the radiating pedunculated bodies, we shall *generally* find, that on one or more sides it dips down deeply into the mass of the tumor. It thus forms part of a septum, which separates one packet of pedunculated bodies from the others, which usually concur to form the mass of the tumor; for it, comparatively, rarely happens that the

tumor is composed of a single cyst filled with pedunculated bodies¹."

Thus, according to this investigator, the existence of carcinomatous matter involves that of a cyst; the former cannot be developed unless in the latter, which is therefore at once its seat and source. Now although this theory leaves the causation of cancer as much unexplained as ever (for the development of the cyst itself remains to be accounted for), it is, if well founded, a very important contribution to the anatomy of these diseased structures, and therefore deserves to be carefully examined. Serous cysts are undoubtedly often associated with carcinomatous growths. In the first place, as we have already intimated, a lamina of serous aspect forms, in rare cases, the internal layer of the capsule of encephaloid tumors, in the manner described by Dr. Hodgkin. But we are not acquainted with any facts proving that this lamina precedes the cancerous substance in order of development; the contrary is indeed more likely to be the truth for the following reasons: the lamina in question appears to be simply a modification of the inner surface of an ordinary capsule of condensed cellular membrane, which is confessedly, when it exists, formed subsequently to the cancerous mass; the connexion between the cyst and its contents is not necessarily either close or universal, nor, according to the experience of numerous observers, are the cellular septa of the tumor distinctly productions from it. Secondly, though serous cysts with contents of different kinds are frequently seen in the interior of cancerous growths, we have never yet observed a particle of encephaloid, scirrhus, or colloid actually within the cavity of such contained cysts: though it is far from uncommon to discover a protrusion inwards or partial collapse of some portion of their walls, probably from local activity of growth of the cancerous

¹ Morbid Anatomy of the Serous and Mucous Membrane, p. 251.

tumor. - The origin of these internal cysts we shall hereafter endeavor to explain. Thirdly, in connexion with simple or multilocular cysts of the ovary and mamma, encephaloid vegetations of various sizes and shapes are occasionally found protruding into the cavity of those cysts; but we have not been able to ascertain that such vegetations are surrounded by a serous sac developed within the original one. It is, we think, evident that the carcinomatous matter originates in these cases between the external surface of the pre-existing serous membrane and the adjoining stratum or cellular or fibrous tissue, and hence that the extent of surface of the cancerous growth covered with a reflection of the former is always in the inverse ratio of the breadth of base of that product. Laennec had noticed this partial cystic investiture under other circumstances, and attempted to explain it by supposing the cyst in course of formation; but this hypothesis is untenable; the peculiarity seems to be caused from cancerous matter, produced outside a pre-existing cyst, carrying inwards the adjoining portion of the serous lamina and eventually bringing it into contact with the opposite circumference. In this case the relation of the cancerous structure to the cyst is that of the testicle to the tunica vaginalis; the former is partially invested by the latter, but is without its proper cavity: and, in truth, according to Dr. Hodgkin himself, this is the mode of connexion of the morbid matter and cyst, for it is clearly impossible that the supperadded growth should at once be within the cavity of the serous sac and invested by a reflection of it. So long then as the connexion of cysts with cancer is traceable, their independence as cause and effect seems apparent. Besides this, it has been alleged by Dr. Carswell, who has used very much the same line of argument as the above, in refutation of the cystic theory, that carcinomatous structure, when connected with a cyst, is supplied with blood by vessels not belonging to that mem-

brane. This pathologist admits that cancerous matter may be thrown out on the internal surface of accidental cysts developed in subjects of a cancerous diathesis: he does not, however, state that he has actually seen carcinoma so situated. *In the case of abscesses one finds the same substance*

The theory just examined makes the existence of a cyst of primary importance in the formation of cancerous matter; but Dr. Hodgkin modifies, in another part of his volume, its obvious bearing in this respect. He there "takes views of the commencement of the adventitious structure, which exclude the question as to the priority of the cyst or its contents, as the formation of both is almost simultaneous, and proceeds *pari passu*." (p. 281.) All claim to formative function on the part of the cysts is here relinquished. *in a cyst and it gets to form a volume each performs its function in the cyst of these times*

M. Cruveilhier, whose laborious attention to pathological anatomy for a number of years entitles his inferences to most attentive consideration, professes opinions on the subject of the seat and origin of cancer materially different from those held by his contemporaries. M. Cruveilhier's doctrine embraces two essentially distinct propositions. First, he regards all heterologous formations "as the exclusive result of a successive deposition of morbid products in the cellular element of organs;" he believes that "this cellular element is alone affected; that the proper tissue of organs is in itself incapable of undergoing any organic lesion, except hypertrophy and atrophy; that at first rendered hypertrophous by the state of irritation existing in the neighboring cellular membrane, these proper tissues subsequently become atrophous and finally disappear in consequence of the pressure they undergo from the diseased formation." But this unalterableness of composition of the organic tissues is the least important part of the doctrine; for, secondly, "it results from his researches that the formation of cancer, like all nutritive phenomena, physiologi-

cal and morbid, takes place in the venous capillary system ; that from it the morbid products are poured into the cellular membrane, either by exhalation or through lacerated openings¹." This latter proposition, as it affects cancer, is evidently only a part of his more general theory, according to which the various phenomena of nutrition, secretion, and inflammation, are accomplished, not as has heretofore been believed in the arterial, but in the venous capillaries. It would be foreign to our present purpose to inquire into the validity of the arguments on which the learned Professor rests his general doctrine ; we have at present only to do with the particular evidence adduced by him to prove that carcinoma occurs primitively and invariably in the seat he has assigned. Now in the numerous passages of his great work in which this theory is emphatically dwelt on, and pronounced to be a demonstrated truth, we find no single fact but the occurrence of carcinomatous matter in the veins advanced in its support. We shall by and by inquire whether the inference from the fact is perfectly warranted.

Carswell's
Long
Dr. Carswell has investigated the delicate points under consideration on the correct principle that, in order to obtain satisfactory results thereon, the morbid matter must be observed as soon as possible after deposition, and its development thus traced, as it were, *ab ovo*. Examining the question in this way, he conceives he has ascertained

¹ The escape of the cancerous matter from the capillary vessels is a point of inferior importance, and apparently rather accidental than otherwise, according to M. C.'s notions. In speaking of cases in which the uterus looks healthy, though it affords cancerous matter on expression, he states that the veins are its containing element, but that as they retain their normal dimensions, there is no atrophy of the proper tissue of the organ. Where there is formation of distinct tumor, the coats of those vessels become enormously distended by the morbid matter, and excessively fragile. Livrais. xxvii.

that carcinoma originates in three positions — in the molecular structure of organs as a product of nutrition; on free serous surfaces, as a result of secretion; and in the blood.

Deposition in the molecular structure of organs is exemplified by the mode of formation observable in the liver. If a liver studded with carcinomatous growths be closely examined, certain minute spots may be detected, in which a slight change of color indicates the commencement of the process of morbid formation. This alteration of color may be limited to a single "acinus," or occur in several of these bodies either successively or simultaneously. Their natural color is succeeded by a pale milk-white, or straw tint, the alteration being attended with an increase of consistence; but at the same time, and this is represented to be the most important circumstance attending the diseased process, the form and bulk of the "acini" remain unaltered. Hence it is inferred that the foreign substance must be introduced in the same order as the normal element of nutrition; otherwise a change of bulk would co-advance with that of color and consistence. M. Cruveilhier also observes, that cancerous growths of the liver in the nascent state accurately represent in point of form the hepatic granulations, and that the disease originates in the granulations themselves, and not in the cellular membrane connecting them.¹ Admitted by observers whose theoretical notions are very widely opposed, there can be little doubt of the reality of the alleged fact: their explanation differs, however: that of Dr. Carswell we have just seen: according to the French pathologist the venous capillaries are in the hepatic granules, as elsewhere, the anatomical element primarily affected. Dr. Hodgkin on the other hand believes that the cellular membrane accompanying the vessels and ducts in the texture in which the diseased formation com-

¹ Livrais. xii. Foie, p. 5.

mences. The judicious use of the microscope is absolutely required to enable us to decide with which of these opinions truth lies.

The alleged fact that carcinoma is thrown out on the free surface of serous membranes, is adduced by Dr. Carswell as strongly corroborative of the views just stated respecting the nutritive transformation of the tissue of organs, for the distinction between the processes of nutrition and secretion is merely nominal. The analogy is, no doubt, strong; but the production of cancerous matter on free serous surfaces—we have ourselves never seen a specimen in which the morbid formation distinctly occupied this situation—is, to say the least, an extremely rare phenomenon. Indubitably, the vast majority of growths connected with serous tissues are developed in the cellular membrane beneath them; this we have had frequent opportunities of ascertaining by careful dissection of incipient pleural and peritoneal patches; even the growth figured by Dr. Carswell, as illustrating his opinion, appear to be contained in a pouch of the distended serous membrane. Cancerous tumors of the meninges, when connected with the arachnoid, originate either in the cellular tissue between the internal surface of the dura mater and the parietal portion of the serous membrane, or under its cerebral lamina; their investment by the arachnoid is demonstrable by dissection. In such reports of cases of similar disease of the pericardium as we have met with, the morbid product is described to have been seated on the attached surface of the membrane¹. But the question is, we admit, not one of frequency: if carcinoma has actually been *effused in a single instance* into a serous cavity, Dr. Carswell's thesis is defensible². Persuaded of

¹ A case related by Dr. Bright (Med. Chir. Trans. vol. xxii. p. 17.) appears to furnish an exception to this statement.

² Vessels have recently been spoken of as "shooting into the serous cavities, as it were into space;" and, we believe, such ves-

the fact, this eminent pathologist ascribes it to the "*separation*" of the morbid matter from the blood. This leads us at once to consider the state of that fluid.

As the subject of cancerous vitiation of the blood itself is an extremely important one, we shall lay before the reader, as concisely as possible, such facts as have been established respecting it, and the conclusions drawn from these by different pathologists. The earliest careful observations respecting the presence of cancerous matter in the vascular system appear to have been by M. Velpeau¹. In 1824 this inquirer read an essay to the Academy of Medicine containing two cases related with much precision. In one of these an encephaloid mass appeared in the vena cava communicating with similar structure in the kidney; and an enormous coagulum extending from the iliac veins through the cava inferior to the right auricle, presented from place to place the characters of encephaloid matter of varying firmness. The coagula in the heart had apparently formed after death, yet in one of them, placed between the walls of the ventricle and the triscuspid valve, was contained "some substance of purulent or encephaloid aspect, like that contained in the kidney." In 1829 M. Andral announced his having discovered carcinomatous matter in the trunk and minute ramifications of the pulmonary artery; in other instances, in the branches of the vena porta,

sels are said to contain cancerous matter occasionally. But even if these propositions shall have been proved, they will lend no support to Dr Carswell's notion; there is no analogy between such mode of production of cancer and its effusion or exhibition from the serous substance.

¹ Mr. Langstaff (Med. Chir. Trans. vol. viii. p. 286, 1817,) had already noticed the fact of such presence; in a case of encephaloid disease dissected by him, "some of the veins were filled with matter of the same consistence without its having formed any adhesion with their coats;" but he does not appear to have attached any importance to the discovery.

&c. In the same year M. Cruveilhier, in describing a case of cancer of the uterus and vagina, stated that on cutting the latter membrane slantingly, he ascertained, with the aid of a lens, that the venous areolæ of the vaginal mucous membrane were crammed with encephaloid easily expressible from their interior. M. Bérard's observations in the same direction have already been noticed.

These facts are all evidently referrible to the same category, and simply prove the presence of carcinoma in the interior of the venous system. But the inferences drawn from them are in each instance different. M. Velpeau concluded, from an examination of all the particulars of his cases, that the encephaloid matter in the midst of the venous coagula was not a production of the internal tunic of the vessels, (that tunic was healthy, and not closely connected with the adventitious product, (but actually formed in those coagula; and further that the germ of all such heterologous tissues exists primitively in the blood¹. M. Andral partly coincides in this opinion, maintaining that the presence of the abnormal substance in the blood depends upon transformation of the fibrine of the latter into the former. M. Cruveilhier discovers in the same fact, as we have already intimated, a proof that cancer is a product of secretion by the coats of the capillary veins. M. Bérard entertains no doubt that in the cases observed by him the presence of the foreign formation in the veins resulted from partial destruction of their coats (as long since described by Sir C. Bell²); but he admits that the fact of free encephaloid masses being found in the interior of vessels with sound parietes is not thus explicable.

Now these pathologists have not endeavored to prove what is absolutely necessary for the establishment of

¹ Rev. Médicale, 1825, vol. i. p. 357.

² Surg. Obs. vol. ii. p. 405, 1818.

the doctrine of the production of encephaloid matter in the blood itself or by the coats of the capillary veins; they have not shown that such matter is ever detected in the venous system in cases where no such morbid deposit has pre-existed in the cellular structure of the solids. Hence they have furnished no evidence contradictory of the much easier and more natural explanation that the diseased masses in the venous coagula had found their way into the veins by absorption. It seems highly probable, too, from recent microscopical researches, that in some of the instances referred to, the substance presumed to be encephaloid was not really of that description.

Such was the state of knowledge on the subject when Dr. Carswell announced himself an advocate of the origin of carcinoma in the blood. This pathologist does not found his conviction on the mere existence of cancerous matter in the veins; he affirms not only that the morbid production may be discovered in vessels having no direct communication with an organ affected with the same disease (as when confined to a small extent of the vena porta), but that there are cases in which the venous blood alone is found to be the seat of the morbid accumulation. Of the first of these observations we readily admit the accuracy, but it by no means disproves the fact of venous absorption. There does not seem to be any direct communication between the parenchyma of the lungs and the bones of the extremities; yet the celebrated experiments of M. Cruveilhier show that a single globule of mercury introduced into the medullary cavity of the femur may be detected weeks after in the pulmonary tissue. Nay more, they have proved that mercury, introduced into any part either of the general or portal venous systems, may reach in the first instance the capillaries of the liver, in the second those of the lung. With respect to the second observation, we can only say, that among a vast number of post-mortem exami-

nations, conducted by men familiarized with such researches, we have never seen a case of the description referred to, we have never heard of one, and we have in vain searched periodical works for details demonstrating the reality of its occurrence. Were the fact substantiated it would furnish strong evidence of a *primary* cancerous alteration of the blood, provided the adjoining venous structure were shown to be wholly unimplicated; but while unsupported by a full narrative of the cases from which it professes to derive, the doctrine of such alteration, no matter how eminent the individual by whom it is adopted, can only, we apprehend, be regarded in the light of an hypothesis¹. The fact that the heterologous substance is not discovered in the arterial system (Cruveilhier's statement [p. 594] requires substantiation) is accounted for by Dr. Carswell by supposing that the contractile power of the arteries prevents stagnation of their contents: how far this may be considered an answer to an obvious argument against his theory, we are unprepared to say; it is certain that it is far from convincing.

Further, as Dr. Carswell regards the deposition of carcinoma, through the processes of nutrition and secretion, as the result of its *separation* from the blood, cancerous vitiation of that fluid, preceding the origin and co-existing with the growth of the local malady, is a *sine quâ non* of the development of the latter; according to him the blood is, in a word, the sole primary seat of the disease. Hence the material element of the affection is in circulation in cases, for instance, of scirrhus of the mamma, which re-

¹ Granting that cancerous matter be discovered in the interior of the blood-vessels, it would be necessary to prove its absence not only from the cellular structure of the trunk and extremities and various viscera, but from the substance of the bones, before we become entitled to affirm that it is exclusively contained in those tubes.

mains almost stationary for years, is unattended with secondary formations in other parts of the frame, and gives rise to no marked constitutional disturbance. Now this idea is by others rejected as inadmissible; can we readily comprehend, they allege, how blood holding cancer in suspension can furnish the materials of normal secretions and perform its functions in such manner as to cause no perceptible deviation from the standard of health? How comes it again, it is urged, if this doctrine be well founded, that after the removal of a cancerous tumor the process of cicatrization frequently goes through its stages with regularity, though when the patient dies, one or more viscera are found affected with the disease in such manner as to leave little doubt, in some cases none, that the morbid growths discovered in them were in existence before the performance of the operation. If these facts are reconcilable with the theory espoused by Dr. Carswell, he has at least failed to make manifest their compatibility therewith. For our own part, while we distinctly avow that the difficulty of explaining the apparent contradictions involved in this doctrine furnishes no *proof* of its unsoundness, we reject it as unestablished by experience.

Again, though we look upon it as almost demonstrated that cancerous matter found in the veins has in the majority of cases come there by absorption (see the section on Pathology), yet we are by no means desirous of upholding an exclusive opinion on the matter. Facts well observed prove, in the first place, that growths external to those vessels, in some instances perforate their coats, protrude into, and extend laterally in, their interior. Nor do we deny the possible conversion of coagulated blood into encephaloid; we simply allege that such transformation is as yet unproved. Thirdly, published cases tend to prove the occasional production of carcinoma by the coats of the veins; circumscribed tumors are sometimes found at-

tached to the walls of these vessels by a simple or multiple pedicle (not unfrequently dilating the vein, as M. Cruveilhier observes, into an ovoid ampulla simulating a cyst). These tumors are evidently in organized connexion with the vascular tunics — a fact arguing in its favor, though it by no means demonstrates their production thereby¹.

It may, we think, be fairly inferred from facts hitherto ascertained, that the primary seat of carcinoma is the intervascular interstices of all the organized tissues and parenchymata, in rare instances possibly free serous surfaces and the interior of the veins. Wherever there are capillary vessels composing a nutritive or secretive apparatus, cancerous matter may be produced; that it may be sometimes retained in these may reasonably be supposed, but there is at present no proof of the fact. Secondly, the proximate cause of the formation consists in a perversion of the acts of nutrition or secretion. But though we believe it unnecessary for the comprehension of cancerous development to admit that the material element of the disease circulates with the blood previously to its local manifestation — that a *cancerous vitiation* of that fluid is the first step in the train of morbid changes — we do not mean to affirm that the blood possesses its normal constitution even at that period: and further we are persuaded that

¹ In M. Cruveilhier's twenty-ninth Fasciculus is the engraving of a large lobulated polypiform encephaloid mass found attached to the wall of the right auricle, almost completely filling that cavity and extending into the right ventricle and both venæ cavæ. The continuance of life under such circumstances is only explicable by supposing the growth of the tumor to have been extremely slow. No suspicion arose during life of an affection of the circulating organs being in existence. The patient died suddenly after a hearty meal, in all probability from some derangement of the relative position of the diseased mass, the valves and orifices of the organ. The parotid glands were the only other organs affected with the disease.

when *secondary* cancerous impregnation occurs, it must exercise a material influence on the activity and increase of local growths. Both these questions, which refer to the doctrines of diathesis and secondary formation, will be attended to elsewhere.

If doubt and uncertainty still hang over the points just considered, pathologists are yet more ignorant respecting the nature, and indeed the existence or non-existence, of a local structural change in the elementary constituents of the tissues preceding the deposition of cancerous matter. The German inquirers have not applied the microscope to this fundamental part of the subject; and no authorized statements have yet appeared from the observer in this country, who has long been employed in its investigation.

(b.) GROWTH. — Like all bodies possessed of the power of adding to their own development, carcinomatous tumors grow by intussusception; they abstract from the blood materials for conversion into their proper substance, and are the seat of circulation, absorption, and nutrition. We have already referred to the vessels of these growths, to the difficulty of detecting them in scirrhus and their abundance in encephaloid. Some of these vessels are manifestly in communication with those of the surrounding tissues; while the relation of others in this respect is yet matter of uncertainty. The mode of formation of the latter appears traceable with the naked eye as follows. In one point of a tumor may be seen some minute unconnected points of blood; at another a number of such points united in linear juxtaposition, so as to form a streak of blood uninclosed in any distinct vessel; elsewhere a vascular investment is found for a similar streak; further on, a similar piece of delicate tube divides at each extremity into a number of tapering ramifications, assuming a stellate arrangement. So far as these facts go, they argue in favor of the opinion

of Cruveilhier, Carswell, and others who regard the vessels in question as "perfectly independent of the general circulation," and formed *de novo* in the morbid matter, in the same manner as the vascular tissue of the ovum. But as this opinion is one which clashes with received physiological notions, and as the appearances referred to are of gross character, while the earliest phenomena of formation require the application of the microscope, it cannot be embraced without hesitation. Dr. Hodgkin and others regard the notion of new-formed vessels as totally inadmissible. Be this as it may, the tubes in question (in which Lobstein affirms that he saw the circulation going forward with the help of a common lens) constitute what Dr. Carswell terms the *proper* circulating system of encephaloid in contradistinction to the manifest offsets from the surrounding arteries, which form the *collateral* supply. The predominance of either of these systems appears to vary with the consistence of the growth; the collateral is most abundant while the tissue is firm and resisting, the proper under the contrary circumstances.

Different opinions are professed respecting the origin of the containing element or septa of carcinoma. While some maintain that it is formed of the natural cellular tissue of the part in a state of hypertrophy and induration, the majority of writers consider it a new formation, as proper to carcinoma as the contained matter. Dr. Carswell remarks in confutation of the former opinion, that cellular membrane in a state of acknowledged hypertrophy, such as is met with in elephantiasis Arabum, has no tendency to terminate in cancer, nor does hypertrophy of the heart from disease, or of the muscles from frequent exercise, ever present any other change (except slight increase of consistence) than that implied by this term; besides carcinoma appears in situations where the cellular tissue is either very scanty or does not at all exist. According to Dr. Hodgkin the septa

are "neither the dilated terminations of the extreme branches of any of the three vascular systems, nor modifications of the cells of the cellular membrane," but the walls of newly-formed cyst, as already explained. The microscopical descriptions of Müller argue for their new formation. On the other hand Cruveilhier believes them composed of the parietes of distended veins; an obvious difficulty attending this notion being got over by the hypothesis "that the existence of a natural venous plexus, wherever a normal secretion is accomplished, and of an adventitious venous plexus wherever an accidental morbid secretion or process is in activity, is a *law* of the economy."

The opinion of Cruveilhier is purely hypothetical; neither of the others is exclusively correct. That the septa of one variety of mammary scirrhus are formed of the laminar intersections of the gland does not admit of a doubt; but they are these laminæ not merely thickened and indurated, but also infiltrated with cancerous matter: in another variety the lactiferous ducts manifestly form the radiating septa of the growth. On the other hand the argument of Dr. Carswell respecting the absence of cellular membrane proves conclusively, that in some situations the septa are of new growth. Besides, as has been remarked by Bérard, if the new portion of carcinoma were limited to the contained matter, this morbid structure would hardly present the uniformity of aspect and properties which, with unimportant exceptions, it is observed to possess in every organ and tissue of the economy. The exclusiveness of authors' opinions appears to have originated in their referring solely either to infiltrated or tuberiform cancer.

The application of the microscope has within the last few years given a new character to our knowledge respecting the growth and increase of carcinoma. Before stating the theory to which Müller has been thus led, we shall briefly

describe the doctrine professed by Schwann on the development of the normal embryonic tissues¹; the former is little more than a novel application of the latter. According to Schwann the primitive or embryonic structure of almost all animal tissues is demonstrably cellular; the component cells are, further, identical in point of structure with those of plants, and originate and are developed in pursuance of the same laws as those discovered by Schleiden to regulate the cells of plants. The young cells always contain a nucleus in their walls, from which they originally sprang; and they grow either within pre-existing cells (and consequently from nuclei formed in the cavity of those cells, and without connexion with their walls) or outside those pre-existing cells.² Now the former mode of formation occurs according to Schwann in cartilage and in the *chorda dorsalis*²; the latter appears to prevail in many other parts, inasmuch as all the tissues of the embryo, according to the same physiologist, consist of cells with a parietal nucleus, and the origin of new cells in the interior of the old ones cannot be demonstrated in all of those tissues. In the adult, too, we have an example of the production of cells

¹ See Froriep's Notizen, Nos. 91, 103, 112. January, &c. 1838. Schwann's observations were originally made on the embryos of the lower animals, some of them mammiferous: but that the mode of growth described by him prevails at least in the cartilaginous tissues of all animals, is spoken of by Müller as matter of certainty.

² This body must not be confounded with the spinal chord. The *chorda dorsalis*, which is developed along with the *laminæ dorsales* from the primitive streak of the embryo, and consists at first simply of a row of dark globules, more closely aggregated towards the anterior extremity than elsewhere, runs exactly in the axis of the future spinal column—the bodies of the *vertebræ* in fact form around it. It appears to be analogous to the cartilaginous filament found persistent in the vertebral column of some cartilaginous fishes. (Vid. Burbach's Physiologie, bd. ii. s. 244, 1828.)

with a parietal nucleus *outside* the old cells in the instance of the epithelium; no encasement (*einschachtelung*) of cells is perceptible here. (Henle.) The formation of new cells is best observable where it takes place in the interior of old ones, that is, where the nuclei apply themselves to new cells developed in the interior of the pre-existing ones. This development occurs in the following manner. Each nucleus produces a new cell, which protrudes from its surface like a watch-glass from a watch; with the progress of growth this new cell enlarges, and the nucleus remains permanently in its wall. When several young cells are thus produced in the interior of a mother-cell, they fill it completely when full grown, and their walls become incorporated with those of the mother-cell. Fresh nuclei form in the interior of these young cells, producing in their turn a third generation and so on. The walls of the new cells are perfectly transparent; those of the old thicken, and in many cases become the seat of fibrous formation. Thus are produced and grow the cells of cartilage and of the chorda dorsalis, and probably of the decidua likewise. It follows further from these observations on the tissues of the embryo, that caudate corpuscula are a metamorphosis of primitive cells. The external membrane of the ovum, among other parts, regularly contains such bodies, which run into long filaments, and thus form the fibres of that tunic.

Now that the development of carcinoma proceeds on similar principles is according to Müller, from whom we have chiefly borrowed the above account, most satisfactorily traceable in colloid. (Pl. II. Figs. 6, 7.) The cells of this formation contain whole generations of more recent cells within them, which, as in the chorda dorsalis and in cartilage, originate from cytoblasts; the latter are, on account of their large size, yellow color, and opacity, easily discernible in the cells of this species of cancer. When the

fibrous formation, already referred to in the description of colloid, is developed on the largest cells, the fibres form the bed or stroma for the deposition of cells of younger growth.

In carcinoma simplex (scirrhus) and reticulare there is often, but not constantly, found, in addition to the appearances described in the section on the anatomy of these growths, a species of cell containing one or two smaller transparent vesicles with a minute nucleus. Müller considers it natural that these vesicles should not be invariably met with, as their discovery depends upon the observer's examining them precisely at the period of their internal development. But he is far from believing that all the cell-globules of these varieties of carcinoma originate in this manner as germinal cells in the interior of others, and subsequently become free by the bursting or dissolution of the mother cells, as occurs in colloid. Their appearance is not, he conceives, sufficiently constant to warrant this view. On the other hand the fact that several minute corpuscles are usually all that is discovered in the cell-globules, argues forcibly in favor of the idea that new sub-cells grow as easily and even more easily outside than inside the pre-existing cell-globules; since these sub-cells are there developed from granules in the same manner as in the interior of pre-existing cells. These granules may become free either through the collapse or dissolution of a larger cell, to which they are attached, and then be developed; but they may also originate independently of and outside other cells. Here then we have the counterpart of the second mode of normal formation — that exhibited in the growth of the epithelium cells.

The microscopical cell-globules of colloid and scirrhus are not, as might be supposed, primarily dissimilar; the difference in the aspect of the two growths essentially depends on the different modes of development of these cells.

In colloid the mother-cells go on increasing in size, and attain two, three, or more French lines in diameter, the walls of the sub-cells coalesce, and when these fill the mother-cell, become incorporated with its parietes. In scirrhus on the contrary this enlargement and cohesion of the cells do not occur, they are easily separable from each other, and retain persistently their primary condition of microscopical formative globules. The old cells appear to crumble away.

In the tumors with caudate corpuscula, these bodies are clearly formed, according to Müller, from cells with nuclei; for he always observed isolated cells, filled more or less distinctly with granular matter, and often provided with a manifest nucleus, associated in the same tumor with them, and predominating in its non-fibrous parts. Moreover the round cells pass by imperceptible degrees into those with tails, while the latter are transformed into filaments, and form the commencement of a fibrous formation.

Briefly to recapitulate the results of Müller's inquiries — he has advanced that cytoblasts form cells; that new cells are generated, either inside or outside those of prior existence, from a nucleus or granule; that the cells are under certain circumstances converted by flattening and elongation of their extremities into caudate bodies, (Pl. I. Fig. 7.) and that these caudate corpuscles when placed in lateral and terminal juxtaposition (Pl. I. Fig. 4.) form fibres. Hence by the persistent generation of cells the bulk of each growth is sustained and increased. In one species of cancer (reticulare) the fibrous appearance is stated to be produced by inlaying of granular corpuscula, but we do not find the nature and mode of growth of these, and the conditions regulating their fascicular arrangement explained.

It will be observed that the origin of the cytoblasts is in

this theory the unsolved problem; until this be decided, whatever light Müller's researches may have thrown on the mode of increase of these products, they have by no means cleared up the history of their origin. The only probable method of discovering the cause and mode of their primitive production—the physical change directly preceding it, namely a minute scrutiny of the state of the vessels leading to the molecular seat of the disease, has not been pursued by this observer. "There is nothing peculiar," he affirms, "in the condition of the capillary vessels of most tumors, with the exception of those formed of erectile tissue." He has even omitted the anatomical description of the larger vessels of cancerous growths, on the ground that they do not differ from those of healthy parts; he says, however, incidentally, that the vessels of scirrhus are sometimes dilated and their walls thickened. Had Müller applied the microscope to the investigation of growths in the earliest stage of development cognizable by that instrument, instead of merely analyzing the elements of tumors—had he traced the process of formation *ab ovo*, he might possibly have made a nearer approach to clearing up the mystery of their production.

From these investigations, however, an important fact apparently derives: the microscopical elements of cancerous growths and their mode of propagation are identical with those not only of benignant tumors, but of the normal embryonic tissues. But we cannot agree with Müller in his inference, that this identity proves carcinoma not to be a heterologous formation. As it appears to us, such identity simply shows that the heterologous character, visible and palpable as it is, is produced not by the nature, but by the mode of combination and arrangement of the ultimate physical elements of the diseased growth. As well might it be contended that calomel and corrosive sublimate are not heterologous to each other, because they are both composed of atoms of chlorine and mercury.

It may be well to remark, that whatever apparent resemblance the doctrine of Müller bears to the cystic theory of Dr. Hodgkin, there is no real similarity between them. In the one case the phenomena are microscopical; in the other putatively traceable with the unassisted eye: Dr. Hodgkin's cysts form only the containing element of cancerous tissues and do not constitute their contained matter; Müller's formative nuclear cells enter into the composition of both, and especially of the latter: according to our countryman new cysts form from the walls of old ones, and such, too, is the fact in true cystic structures; the German observer has on the other hand, as we have seen, shown that the formative microscopic cells grow from nuclei which may themselves originate free in the interior of or outside the mother-cells.

The variable condition of some of the properties of carcinoma next demands attention. The causes of its variation in *consistence* may be first examined. Laennec, believing he had observed that, when first deposited, carcinomatous matter is invariably firm and hard, and that it subsequently becomes soft and diffuent, as a consequence of its further development, looked upon the degree of consistence of the heterologous growth as a measure of its advancement towards perfect evolution. Hence originated his establishment of two stages of development—those of *crudeness* and of *softening*. But numerous pathologists, who have examined cancer since Laennec's time, have ascertained that its degree of consistence does not by any means furnish a correct estimate of the time elapsed since its formation, that the morbid matter may be extremely soft, nay, diffuent from the first moment it is perceptible by our senses, and hence that such state does not involve as a necessary condition a previous stage of induration. Nevertheless, thus much of Laennec's doctrine seems well founded,—that a tendency to decrease in density, no mat-

ter how soft they may have originally been, is an attribute of these products. His error lay in supposing that they must be primitively hard, and that their subsequent semi-liquefaction was a physiological result of development, instead of being, as it really is, a pathological process, the means whereby their inherent tendency to destruction is realized.

The chief circumstances affecting the physiological density of carcinoma are the nature of the deposit itself, and the peculiarities of the tissue or organ in which it is developed. If examined under favorable conditions for such investigation, that is when their properties cannot be materially or at all influenced by the nature of the part in which they are formed, manifest proof is obtained that the consistence of cancerous growths may depend on peculiarity of intimate composition. Subcutaneous tumors, for instance, belonging to the same species, exposed to the same extrinsic influences, discovered simultaneously and advancing in growth coevally, occasionally differ extremely in point of consistence; one may possess the firmness of a fibrous growth, another the pulpy softness of semi-putrid brain. Under these circumstances the difference depends on the relative proportions of the contained matter and containing cellular intersections. The consistence varies, too, according to the species of cancer. Again, the structure, density, situation and connexions of parts modify this property, as Dr. Carswell has pointed out. "The consistence of the new growth is influenced by its relative quantity to that of the tissues, in which it is contained [in other words, by the space free for its formation], or of a difference in the degree of resistance opposed by the latter to its accumulation or development. Thus it is more consistent in the liver than in the lungs or brain, in the skin than in the cellular tissue or a mucous membrane." But this doctrine is to be received with some restrictions; in the

areolar structure of the bones as well as in their medullary cavity, cancerous growths are frequently of cerebriiform consistence : scirrhus occurs in the brain ; and encephaloid of the firmest character in the cellular tissue under the cerebral arachnoid. Besides, growths presenting the opposite extremes of density are often found in close contiguity in the same organ.

The *dimensions* of carcinomatous growths are influenced, and even more distinctly so, by precisely the same circumstances as its consistence. Thus, in respect of species, scirrhus formations, unless when of the infiltrated kind, reach a moderate size only, whilst encephaloid masses occasionally attain a vast bulk, and colloid productions observe a mean in this respect. Again, in dense parenchymata even encephaloid rarely exceeds an orange in size, in the lungs and testes it grows much larger, while in the subcutaneous cellular tissue it attains monstrous magnitude. The influence of pressure is here remarkable ; while firmly bound down by fibrous resisting tissues, their development is obstructed, but when this obstacle is removed, the immediate result is a sudden increase of bulk. On this physiological fact has been founded one of the methods of treating carcinoma. In proportion to their perfection of vascularization is the facility with which they convert into their own substance the materials circulating within them, and hence too the volume they acquire.

The *rapidity of growth* of carcinoma is similarly affected by the same agencies. Encephaloid holds the first rank, colloid the second in point of rapid development. In respect of the influence of pressure, an encephaloid tumor, which may have taken months to acquire moderate dimensions, rapidly increases in size, when perforation of a compressing tissue opens a free passage for the expansion of the mass. An important illustration of this occurs in carcinoma of the meninges, the eye and orbit, &c.

Further, idiosyncrasy probably influences the celerity of growth. As specimens of the quick progress occasionally observed, the reader may refer to some cases related by M. Andral¹: in one of these, the most satisfactory in its details, an encephaloid growth of the greater omentum, rapidly extended from the great curvature of the stomach to the pubis, *daily* acquired an increase in size perceptible both by the eye and hand, and ultimately carried off the patient in less than five weeks from the appearance of the first symptoms. Dr. Carswell and Recamier narrate similar examples occurring in the lungs and uterus, and we have ourselves met with an instance of equally rapid growth in the extremities. On the other hand these growths sometimes scarcely exceed a walnut in size years after their first appearance: and the large tumor described by Gooch² had gradually increased in bulk during fifty years. Dr. Carswell observes that the more the varieties of carcinoma resemble the natural tissues of the body, the more abundantly they are supplied with cellular and fibrous membrane, the less rapid, *cæteris paribus*, is their development.

Effects on adjoining parts.—While the growth of carcinomatous tumors advances, the condition of the surrounding tissues may either remain unaltered, or as is much more uniformly the case, undergo some one or more of a variety of changes.

In certain situations cancerous deposits may acquire considerable volume without apparently influencing the substance of the part in which they are formed. This is observed in the lung and in the encephalon, even when no cyst intervenes between the abnormal and natural tissues;

¹ Archives Générales, &c. t. ii. p. 209.

² Cases and Remarks; p. 165. 1758. The encephaloid nature of this growth cannot, however, be regarded as perfectly certain.

hundreds of tumors are sometimes found in the liver, separated by perfectly normal structure. This is usually explained by supposing the adjacent structure to be driven aside, in proportion as the morbid matter is deposited; but if this were the case, indurated condensation would be produced; a stratum of tissue of variable thickness is probably removed by absorption.

The simplest effect produced on the circumjacent substance is its *condensation*. Of this we may again find an example in the pulmonary organs; subpleural encephaloid, of such magnitude as nearly to fill one side of the chest and dislocate the heart, may not otherwise affect the lung than by compressing it into a small firm mass. This fact is more familiarly exemplified in the condensation of the adjoining cellular substance by subcutaneous tumors. Aided in some instances by slight hypertrophy of the cellular laminæ, a pseudo-cyst investing the morbid growth is thus developed. The formation of this natural barrier between the diseased and healthy tissues, more frequently observed in the case of encephaloid than of scirrhus, no doubt helps to defend the latter from infiltration with the morbid matter. The substance thus cut off, as it were, from surrounding parts, has less tendency to contract adhesions with them — a circumstance furnishing one of the diagnostic signs between the two species of cancer mentioned. Secondly, these tumors produce *mechanical effects* regulated by their size and position. Thus if developed around the vena porta, they interfere with the circulation in that vessel and induce ascites, &c.; if embracing or pressing on the aorta, they may cause partial or total obstruction of its cavity, as in cases related by Cruveilhier, Velpeau, and Lawrence¹. When seated in the orbit, they cause gradual dislocation and extrusion of the eye, &c. Thirdly, *discoloration* of the neighboring

¹ Med. Chir. Trans. vol. viii. p. 13.

parts is sometimes effected in a manner as yet unexplained: thus the fat adjoining mammary carcinoma assumes a yellowish saffron tint. In advanced stages of cancer in the same organ, the integuments acquire a dingy green or olive hue, ascribable, as Dr. Hodgkin mentions, to changes in the venous blood. Various alterations of tint follow, too, from mere languor or obstruction in the tegumentary circulation. Fourthly, cancer, when so situated as to oppose the onward movement of the contents of hollow viscera, leads to *hypertrophy* of the muscular apparatus behind the obstruction. Thus in anal carcinoma the muscular tunic of the rectum undergoes thickening; when the disease is seated at the cardia, the œsophagus is similarly affected. The increased nutrition is however the mere result of the additional muscular power required to overcome the mechanical obstacle, and is not a specific effect of carcinoma. But a change of nutrition of another kind is sometimes observed in cancerous organs. In scirrhus of the mamma, as has been observed by Sir C. Bell, Scarpa, and others, the proper tissue of the gland occasionally suffers *atrophy*; in such manner that a breast in which an heterologous growth is encased hardly or not at all exceeds its healthy fellow in bulk. In other cases, on the contrary, the diseased organ undergoes general enlargement, or parts of it may be atrophous and others tumefied. The first of these cases is termed by Recamier *hypertrophous*, the second *atrophous engorgement*; the combination of the two states produces inequalities and bumps. Fifthly, carcinoma sometimes produces *absorption* of the part on which it presses. This is exemplified in the progress of meningeal cancerous growths which, after producing perforation of the cranium, sprout out through the opening: mediastinal carcinoma, also, not unfrequently leads to attenuation of the sternum, in the manner of aortic aneurisms. Sixthly, *serous infiltration* is frequently observed round subcutaneous and glandu-

lar tumors ; and it is stated by Cruveilhier, that in cases of cancer of the cylindrical bones, the medulla is not unfrequently saturated with serosity. Seventhly, *inflammation* almost invariably occurs sooner or later in the tissues investing carcinoma : it is either eliminatory or not in its effects. Of the former kind we shall have occasion presently to speak : among the less familiarly observed examples of the latter may be cited gelatiniform softening sometimes produced in the cerebral tissue subjacent to meningeal cancer ; peritonitis spreading from the seat of superficial carcinoma of the liver and giving rise to ascites ; pleurisy occurring as a consequence of the extension of hepatic cancer to the diaphragm. Eighthly, *fibrous transformation* is sometimes observed. Cruveilhier has found the hepatic tissue between cancerous tumors converted into true fibrous substance, and relates a case of mammary carcinoma, in which the pectoralis muscle had undergone a similar change of structure. Ninthly, the extension of the disease to contiguous textures by *infiltration* occurs in the case of the three species, but not with the same frequency. Encephaloid has been by some considered more prone to push the adjacent parts aside, than to convert them into matter like itself : Abernethy considered this a fact of sufficiently constant occurrence and importance to warrant a complete separation of scirrhus and medullary sarcoma. But it is far from unusual for encephaloid of the cellular membrane of the limbs to spread to the adjoining tissues. Cerebriform growths originating under the peritoneum spread to the bones of the pelvis, and even of the thigh : this progressive destruction even of the hardest tissues was by Ruysch esteemed so important that he named the disease ossivorous tumor : we have ourselves observed cases, one in particular, in which the infiltration of the muscular, consequent on the pressure of a tumor in the cellular tissue, was so perfect that the former seemed formed of fasciculi of en-

cephaloid fibres. Such facts are so common that it is needless to multiply illustration. Dr. Hodgkin goes so far as to affirm that encephaloid is more prone than scirrhus to affect the surrounding tissues by infiltration. In this extreme opinion he is, we think, unsupported by facts. Dr. Bright¹ coincides with this observer, however, while Dr. Copland espouses the erroneous notion of Abernethy. The extension of scirrhus to contiguous textures is a very constant phenomenon; as it spreads, the scirrhus growth loses its circumscribed, rounded, movable character. Perforation of the hollow viscera consequent on conversion of their walls into cancerous matter is an occurrence familiar to the clinical observer. Such destruction of the recto and vesico-vaginal septa forms one of the most deplorable epiphenomena of uterine cancer. Mr. Travers and Dr. Hodgkin suppose that the extension of the disease to neighboring parts is preceded either by absolute inflammation in those parts or by a state of irritation almost amounting to this; no observed facts are adduced in confirmation of this opinion. The process of *adhesion* to surrounding tissues need not be separately described; it is effected by several of the changes just referred to, and will be further considered in describing the disease in particular organs.

The albugineous tissues generally are remarkable for their power of resisting cancerous infiltration: a fact illustrated by the effect of fasciæ on these growths, by the progress of meningeal cancer and by the occasional coexistence of the disease on both sides of the sclerotica, itself remaining unaffected. The *arterial tissue* in connexion with carcinoma commonly remains unbroken for a length of time, while the investing textures undergo rapid destruction. But that the arteries are not always spared, appears from their occasionally giving way with dangerous facility,

¹ Guy's Hosp. Reports, vol. iii. p. 254.

when ligatured in the immediate neighborhood of cancerous formations. Fatal hæmorrhage sometimes results, as Bérard remarks, from extension of the disease to the chief artery of a limb, and hæmatemesis with a similar result has followed erosion of the splenic or coronary arteries in cancer of the stomach, &c. The adjoining arteries are sometimes dilated; Cruveilhier has seen nameless ramusculi, running to a mammary cancer, acquire the caliber of the radial. The *veins* in communication with these products undergo singular enlargement; but a similar effect is produced by other tumors. Numerous observers have ascertained that these vessels become morbidly friable, a fact particularly insisted on by Recamier. Of the presence of cancer in their interior we have already spoken. The condition of the adjoining *nerves* varies. Their tissue may retain all its normal characteristics; it may be absorbed from pressure; become cancerous; or the nervous substance may alone be absorbed, while the neurilemma, thickened and indurated, assumes the characters of fibrous tissue. They have been more commonly observed to undergo encephaloid than scirrhus infiltration: Breschet has, however, found the areolæ of their tissue infiltrated with a liquiform matter resembling that of scirrhus. The *excretory ducts* of glands are sometimes stuffed with the morbid matter: the ureter has thus been found partially or wholly obstructed, and Müller has ascertained the same fact in respect of the galactophorous ducts. The condition of the *lymphatic system* will be examined elsewhere.

So far we have described the regular phenomena of development of carcinoma; but this tissue being, as the normal textures, the seat of nutrition, is like them susceptible of its disordered actions. The more important of these may be passed in review.

Partial or general *congestion* may be either, it is said, arterial or venous: in the former instance resulting from

irritation, in the latter from obstruction to the venous circulation. The first consequence of this may be supposed to be a change in the color of the diseased mass, if it be highly vascularized; in the one case a florid hue becomes manifest, in the other a purple, brown, or black tint.¹ But, chiefly owing to the delicacy of the vessels in the adventitious growth, the trifling support received from the substance in which they ramify and their imperfect communication with each other, extravasation of blood almost always follows. The *hæmorrhage* thus produced may, authors assure us, be so abundant as to cause a sudden and visible increase in the size of non-ulcerated tumors. Encephaloid, in which hæmorrhage of this kind has recently occurred, is found infiltrated with the effused fluid or broken down and mixed with grumous coagula: the appearances in the one case resembling those of the capillary apoplexy of Cruveilhier, in the other of ordinary cerebral apoplexy. Occasionally the mixture of encephaloid in small proportion with a preponderating quantity of blood produces a kind of pulpy detritus, excellently likened by Andral to the red grumous matter filling the loculi of certain softened spleens. The subsequent changes of the effused blood are strikingly similar to those observed in cerebral hæmorrhage. The liquid portion is gradually absorbed with the hæmosine; the discolored fibrine remains behind in a sort of cavity lined with a smooth and delicate membrane, while the circumjacent cancerous matter acquires a yellow tint: at a more advanced period the clot disappears, the lining of the cavity is more distinctly serous in character, its contents a serous or gelatinous matter. Such is, doubtless, the origin of the greater part of the cysts, of which we have already spoken, found in the interior of carcinoma. Wherever and under whatever circumstances blood is effused into the tissues, there is a tendency to the formation of a pseudo-membrane gradually assuming the serous character.

¹ Carswell.

Another and rarer mode of cerebral hæmorrhage, particularly described by Andral, in which the apoplectic cavity is traversed by filaments interlacing into a rete infiltrated with serosity, has also been noticed in encephaloid.

Or, again, the coagulated fibrine forms a solid persistent mass, which, by undergoing various transformations, gives rise to the cartilaginous, cretaceous, and ossiform particles, occasionally met with in these growths. When carcinoma of a gland is attacked with hæmorrhage, it is not unusual for some of the effused blood to escape outwards by the excretory ducts of the organ. *Extravasation of serum* may occur in encephaloid, and, according to Béclard, give that substance precisely the aspect of the brain, in a state of white softening. A variety of writers speak of *inflammation* of the proper substance of a cancerous tumor as an ordinary occurrence; but the allusions to the actual condition of the morbid matter, when thus affected, are vague and unsatisfactory. We are not aware how such process could be proved to have occurred, except by the discovery of pus in the morbid growth. Now that a fluid, possessing the gross physical characters of purulent matter, is occasionally so situated, is averred by numbers. Cruveilhier speaks frequently of the presence of pus in cancer as a point not admitting of doubt. But the ascertained outward similarity of liquified fibrine and pus seems to render it doubtful, (and at all events shows the importance of further demonstration) whether the common belief as to the frequent presence of the latter in these products is well founded. The testimony of Müller is, nevertheless, strong: he refers particularly to a specimen of reticular cancer, remarkable by its containing a number of cavities filled, some with caseous, others with puriform matter: the smallest of these purulent cavities (*eiterhöhle*) measured half a line in diameter, and were lined with a vascular membrane; but the microscopical and microchemical char-

acters of the fluid do not seem to have been ascertained. In these observations we refer to pus formed in the cancerous matter itself: its production in any of the natural tissues accidentally imprisoned in a tumor, or its passage by imbibition from adjacent structure into the heterologous matter, are less debatable points.

Saline and coloring matters, as well as different adventitious formations, are found in some cancerous growths. The detection of microscopical crystals in encephaloid and colloid by Gluge and Müller has already been noticed.

Carcinoma occasionally presents a black tinge either from abundant punctuation, infiltration, or deposition in masses of *melanic matter*; and an attempt has been made by some authors, led by this accidental impregnation into a belief that melanosis constitutes a separate malignant formation, to class it as a species of cancer. With the holders of this notion we cannot, for the following reasons, agree: 1. Pure melanic pigment, no matter in what abundance it be accumulated, produces no other effects than those dependent on the mechanical obstruction caused by the mass it constitutes. 2. When melanotic tumors produce the local and general symptoms of cancerous growths, they are found to be composed either of encephaloid or scirrhus (more especially the former), impregnated with black matter. 3. Neither the local nor general symptoms of carcinoma are modified in cases in which melanic matter is found to pervade it. 4. Melanic matter is incapable of forming a tissue, being an unorganized fluid into which vessels have never been observed to penetrate. It has been remarked that when one cancerous growth is tinged with black matter, any others in the body are almost invariably found similarly discolored: this fact, to which much importance has been attached, simply proves that there is a tendency in the system to the production of melanic matter. Again, Cruveilhier lays much stress on the circumstance

that "melanic cancer" is rarely solitary: this is the necessary result of the fact, that black or bistre-colored impregnation much more frequently complicates encephaloid than the other species of carcinoma. The French pathologist has not thought of proving, numerically, that such multiplicity of growth is less frequent when the encephaloid is of normal than of abnormal color.

A partial or general *yellowish tint* is sometimes produced in carcinoma, either, as in cases referred to by Laennec and Dr. Graves, by impregnation with the coloring matter of the bile; or, as is more usual, by the changes undergone by the diseased mass in the vicinity of effused blood, resembling those observed in subcutaneous ecchymosis and cerebral hæmorrhage. Dr. Hodgkin expresses his belief, that the yellow tint occurs in the oldest parts of these growths; a remark which we have not seen confirmed. But there is much justness in the observation, that encephaloid thus discolored bears some resemblance to tuberculous matter; a similarity which has caused the former to be sometimes mistaken for the latter. In certain cases the origin of the yellow tinge is difficult to specify.

The partial conversion of cancer into *bony matter* is a phenomenon much spoken of by writers. Ossification, commencing with the central portion of scirrhus tumors and spreading thence to their periphery, is said to convert the whole mass of some scirrhi into bone. M. Trousseau states that he has frequently observed this mutation in bitches; and Dr. Hodgkin instances scirrhi of the uterus, as being especially prone, in the human subject, to such conversion. The septa, or enclosing pseudo-cyst of encephaloid, are represented as occasionally undergoing osseous transformation, and M. Cruveilhier speaks of spheroidal ossiform concretions discovered in colloid of the muscular coat of the stomach. But we believe that, if we here exclude from consideration the bony lamellæ actually continuous with some part of the skeleton, and which form a marked char-

acteristic of certain cancers connected with osseous structure, the phenomenon in question will be found to have been much more written of than observed. Dr. Hodgkin's opinion above stated is easily explained by the fact that he regards the well known "fibrous tumors" of the uterus as true scirrhus of that organ: and it is incorrect to term the matter developed in these cases bone, of which tissue it has not been proved to possess the structural or chemical character¹. That cretaceous or calcareous matter is occasionally seen in carcinoma is nevertheless incontrovertible, and we have already alluded to its probable source. Dr. Hodgkin considers osseous formations comparatively more rare in encephaloid than in scirrhus, and attributes this to the greater vitality of the former; Breschet regards "conversion into bone or cartilage" as affording evidence of excessive activity of nutrition in the transformed part; no proof is adduced of either opinion.

Cartilaginiform substance has rarely been found in cancer. Rouzet reports a case from Lecomte², in which cartilaginous productions were found scattered through a scirrhus of the breast in the form of little round masses or acicular figures; but the true nature of these may be made a matter of doubt. Müller states that *fatty matter* is frequently seen in scirrhus, and that while the fat in true fatty tumors is contained in their formative globules, that occurring accidentally in carcinoma is free, and appears in the form of granules or crystalline particles.

¹ Gluge has shown that the lamellar productions in the arteries, which are called ossifications, and which, in fact, possess more of the outward characters of bony tissue than most abnormal ossiform formations, are composed of microscopical saline crystals, united into a patch by albumen or fibrine. Between this elementary attempt at ossification and the new formation of true bone, as demonstrated by Miescher, there are numerous gradations.—*Bull. de l'Acad. Roy. de Bruxelles, Avril, 1838, p. 192.*

² Journ. de Méd. t. 73, 1787.

Bayle describes a specimen of pulmonary encephaloid containing *tuberculous matter*, distinguishable from the cancerous texture by its yellow opaque appearance: there were tuberculous cavities in other parts of the affected lung. Admitting, however, that the substance presumed to be tuberculous was really of that nature, and not encephaloid accidentally discolored (as was clearly the case in some of the instances referred to by M. Cruveilhier), it does not appear from the description whether the centre of the tumor was formed before or after the surrounding carcinoma. Andral speaks of tumors of the liver formed of a combination of encephaloid, scirrhus, and crude tubercle; Cruveilhier has figured a composite growth in connexion with the kidney, formed of a layer of encephaloid, investing a large mass of "tuberculous" matter; but such facts at the most only prove the occasional association of these morbid products.

It not unfrequently happens that a tumor possessing the characters of scirrhus in the main, discovers in some portion of its substance those of softened encephaloid. This circumstance has been adduced as proving that scirrhus may soften into encephaloid, and hence, as an unanswerable argument in favor of the identity of cancerous tissues, *ab origine*. But may it not depend on the development of encephaloid as a new product in the scirrhus mass? This is a mere hypothesis, it is true; but one more reconcilable with ascertained facts, than the notion that these structures are primitively identical. It surely will not be contended that an erectile tumor may soften into encephaloid, and that both are identical, yet the latter is frequently found in the former. Further, Müller has, as we have already stated, seen a mass of alveolar colloid in scirrhus, and has often observed colloid cancer contrariwise complicated with scirrhus. Is it reasonable to suppose that these two tissues are capable of hardening and softening into each other?

In fact, the thing is impossible, for their elementary microscopical constitution and mode of growth are different.

The only example we have met with in periodical or other works of intimate association of cancerous structure and *hydatids*, is described by Wedemeyer. This observer discovered in the anterior lobe of one hemisphere of the brain, in a subject who had died with cerebral symptoms, a mass of scirrhus hardness and fibro-cartilaginous consistence "surrounded with a grey puriform semifluid matter containing some hydatid vesicles¹." Unfortunately it does not appear whether this semifluid matter was softened cancer, or cerebral substance, gelatinized or infiltrated with pus.

(c.) DECAY. Such are the more important phenomena occurring in these morbid growths, having no direct influence on their destruction and removal. But sooner or later their inherent tendency to destruction breaks into action and elimination commences. These processes are, in general terms, effected by the reduction of the tumor, partially, or generally, into a pulpy matter, and the formation of an opening in the investing natural tissues. The mode in which this conversion into pulpy detritus is effected, is not, we apprehend, satisfactorily established; at least, no demonstration has been given of any of the theories adduced to explain it. Of Laennec's notion we have already disposed; Recamier, and a variety of writers, attribute the change to inflammation of the substance of the tumor — inflammation which is purely imaginary; Lobstein to an "effort of nature to perfect the organization of the part," — a fanciful hypothesis. Drs. Hodgkin and Carswell regard the change as the result of gangrene, itself produced in a variety of ways. In encephaloid, for example, extreme venous congestion sometimes ends in complete

¹ Rust's Magaz. b. xix. s. 229, 1825.

stagnation and local suspension of nutrition ; if this state be persistent, mortification ensues. A similar result follows occasionally from the obliteration of a large venous trunk through pressure, and still more commonly from total obstruction of the veins with carcinoma. The cause of this venous stagnation may also be, according to these authors, very distinctly traced to the unequal growth of some of the minor tumors of which it is composed. The rapid enlargement of one of these interferes by lateral pressure with the circulation in another ; an occurrence promoted by the pedunculated form. This form is again conducive to gangrene, where tumors, in the manner already referred to, pierce the cutaneous or aponeurotic structures ; the edges of the unyielding tissue, which has undergone perforation, exercise forcible constriction on the pedicle of the tumor and interrupt its circulation¹. But this theory involves some postulates not easily reconcilable with ascertained facts. Pulpary encephaloid is a dead-white or pink-colored opaque matter of creamy consistence, without much viscosity, presenting no gangrenous odor, and never giving rise to the symptoms of mortification. How comes it to be thus distinguished from other animal matter in a state of sphacelus ? If it be urged that in softening of the brain, the cerebral substance presents similarly exceptional characters, and yet is gangrenous, we reply that this too is hypothetical. And the objection seems to acquire further weight from the fact, that, in some instances, the destruction of cancer is accompanied with the ordinary appearances and symptoms of gangrene : this, we are aware, may

¹ According to Dr. Hodgkin, when the supply of nourishment is not promptly cut off by the operation of this natural ligature, the parts under the influence of such imperfect nutrition, instead of becoming gangrenous, gradually acquire an increase of density and ultimately become penetrated with "bony matter." It is not stated in what manner this observation was made.

be said to depend on implication of some of the natural tissues. Again, vessels are at no period more abundantly manifest in encephaloid than when softening has actually set in, a fact forming the chief groundwork of Lobstein's notion just referred to. Dr. Hodgkin endeavors to reconcile this fact with his own views by the hypothesis, that the observed vascularity is the result of "irritation which the softened part excites in the neighboring parts, which still retain their life and organization." On the whole, the mode of softening of encephaloid (exclusive of that produced by hæmorrhage) seems to require further investigation.

The appearance of softened scirrhus is characteristic; it is that of a yellowish-brown semi-transparent gelatinous pulp, not unlike apple-juice, lodged in irregular cavities, the walls of which, free from membranous lining, present all the characters of firm scirrhus. The color of the matter is liable to vary, from impregnation with blood.

The gelatinous contents of colloid cells appear to possess the same degree of softness at every period of their existence. The attempt made by Velpeau, to show that tissue of napiform, or solanoid aspect, forms the primary condition of colloid, is by no means successful. The softening and destruction of the mass must, therefore, depend simply upon the occurrence of these changes in the containing septa, the consequent rupture of the loculi, and escape of their contents. Opinions differ respecting the mechanism of this rupture. Cruveilhier conceives that the process resembles a gradual wearing out (usure), layer by layer, unaccompanied with any manifestation of vital activity: and that when perforation is thus accomplished, effusion of the jelly-like matter follows. Müller, on the other hand, supposes, with greater plausibility, that when the growth of the subcells becomes extremely active, they burst their containing cells.

The process of softening may commence in any part of

a carcinomatous tumor, as well at the periphery as the centre. The notion of the constancy of *central* softening has been shown to be incorrect by careful observation. The change may originate in a single spot, or simultaneously in several.

The changes in the surrounding tissues, accompanying this softening, lead to the elimination of the morbid growth. Inflammation and purulent infiltration are among the most important of these. Sloughing of the investing cellular membrane has, in some instances on record, completely disconnected cancerous tumors from adjoining parts, and led to their total expulsion; a natural process of amputation, which has been observed in the instances both of scirrhus and encephaloid. When seated under the skin, cancerous growths either induce ulceration in that membrane, as the result of a languid inflammatory action, or distend it, and successively occasion atrophy from pressure, discoloration, diminution of temperature, of sensibility, and softening; or, when the affected part becomes atrophous, as is sometimes the case with the mamma, irregular retraction, and puckering of the skin, follow; sulci are thus formed, become abraded, and constitute fissures, which gradually spread into ulcers. In any of these cases the skin may itself become cancerous. Perforation thus established, removal of the cancerous matter follows, either in the form of a liquid ichor, or in masses. The latter mode occurs not uncommonly in encephaloid, and leads to the formation of vast excavations with extraordinary rapidity. Professor Bérard refers to a cavity of this kind, sufficiently large to lodge the head of an adult. In the case of this product, there is usually an extreme disproportion between the length of time which precedes, and that which follows ulceration; while the first may be of years' duration, the latter frequently lasts but a few weeks, when death carries off the patient. Scir-

rhous ulcers, on the contrary, advance with comparative slowness, though occasionally proving rapidly fatal.

The appearance of the opening, or *ulcer* is, at first especially, in a great measure accidental. Its edges are sometimes thin, irregular, level with the surrounding surface, or, it may be sunken, undermined, and *inverted*; the latter condition amounting, in some cases, to a kind of reflection of the skin on itself. But this aspect usually changes, and the edges become elevated, and turned upwards and outwards, or *everted*; a state, which is of sufficiently constant occurrence to have been considered almost characteristic of cancerous ulceration. The surrounding skin acquires a bluish red tint to a variable extent round the sore; and the excavated surface of the latter presents an irregular series of elevations and depressions, smeared with a thin watery matter, mixed with decomposed blood, or pulpy detritus, or studded with black patches of concrete hardened blood. The surface of a scirrhus ulcer is, however, sometimes dry, and of reddish, grayish, or brownish color; or, in other instances, covered with a stratum of soft and putrid fleshy substance generally, according to Trousseau, about one, or one and a half lines in thickness, and of the same color as the surface of the sore. Underneath this layer hard scirrhus is discovered, to be in its turn converted into the detritus described, while the healthy parts, still more deeply seated, undergo cancerous infiltration. The everted and elevated condition of the edge of carcinomatous ulcers has been thus explained: the cancerous tissue underneath the border of the skin meets with no resistance on the surface next the sore, and, consequently, grows inwards towards the centre of the latter, at the same time sprouting upwards, in which direction also, it scarcely encounters any opposition; the natural effect of this on the cutaneous edge of the ulcer is to raise it, and turn it outwards. On the other hand, the central portion of the tumor undergoes pressure from the

peripheric portions, and its growth is proportionally obstructed. The absence of eversion is traced to inactivity of the subjacent cancerous matter. These particulars may be easily ascertained, by examining a vertical section of an ulcerated tumor; the protruding marginal growths have a marked tendency to assume the pedunculated form.

Hæmorrhage frequently takes place from the surface of cancerous ulcers. In encephaloid such effusion is sometimes extremely abundant. M. Velpeau relates the case of an individual who lost nine pounds of blood in twelve days from an ulcer of this kind in the axilla¹. Such hæmorrhage is extremely difficult to stop, has a constant tendency to recur, and eventually often proves fatal. In some instances the effusion is attended with a sudden sprouting forth of new growth. Extravasation of blood is less common on scirrhous surfaces, seldom becomes very abundant, and occasionally appears to produce a temporary improvement in the condition of the ulcer. The capillary tubes of the growth are its ordinary source; but it may, as we have already said, originate in erosion of the larger vessels, or rupture of the varicose veins communicating with the ulcer.

The liquid ichor, or sanies, which forms the *discharge* from cancerous sores, is thin, acrid, and generally of a dirty green color, but liable to variation in tint from admixture, in various proportions, with effused blood, or from impregnation with melanotic fluid, as in a case related by Rouzet. It possesses a peculiar, and almost characteristic fetor. It is said by some to effervesce with acids, and turn syrup of violets green; but Ploucquet found, on the contrary, that it exhibited the reactions of an acid. In warm countries, especially, generation of worms not unfrequently occurs in this matter². There is nothing, however, peculiar to the

¹ Rev. Méd. 1825, t. i.

² Vacher, Diss. sur le Cancer des Mamelles, p. 81.

cancerous discharge in such development, yet the fact seems to have led to the singular theory, already noticed, respecting the production of cancer by an insect. Valentin states his having discovered nuclear globules, and cartilage corpuscles in the "pus of a cancer;" but according to Müller, such discharge is not peculiar to this affection, occurring, on the contrary, from all suppurating surfaces. To the similitude of pus granules, and nuclear epithelium cells, we have already adverted. The surface of the ulcer may participate in the kind of formation displayed by the whole mass: thus Müller has seen the white net-work of reticular carcinoma spreading into the minute asperities on the surface of fungating growths; in encephaloid, consisting of cordate corpuscles, the tailed appearance is found in course of development in the most superficial part of new vegetations. The same observer once saw a thick layer of polyhedral chole-steatomatous non-nuclear cells, forming a mass like tallow, on the surface of a cancerous ulcer in the mamma.

Singularly as the fact clashes with the general laws of carcinomatous growths, it is no less true, that these products are not wholly incapable of *cicatrization*. Scirrhus ulcers occasionally assume a healthy vermilion tint, become covered with normal granulations, and actually cicatrize over a greater or less extent of surface. Abernethy relates a case of encephaloid tumor of the groin, in which, after the removal of a "portion of the tumor," the ulcer gradually "lost its inflamed aspect, granulations formed, and a cicatrix took place." M. Bérard witnessed a similar occurrence: and cerebriiform cancer of the limbs and meninges has been known to cicatrize in the same manner, after inopportune incision. According to Bayle, the majority of scirrhus formations, in which this change is observed, are of a particular structure and character. Pouteau considered them the most intractable of all. Certain it is, that

the amendment is delusive and temporary: the process ceases, and the disease advances with renewed activity. It must be understood, that we here refer solely to cicatrization occurring over actual cancerous substance.

The reappearance of carcinoma in the situation of its previous development, after the spontaneous separation, or artificial removal of a tumor, is unfortunately a most common occurrence. This *local reproduction* is effected in different ways. 1. The process of cicatrization may not distinctly commence, or be interrupted at an early stage, and fungating growths spring from some part of the wound. 2. A perfect cicatrix forms, and after a variable lapse of time, a tumor grows in the subjacent tissues, presses on the inodular structure, destroys it, appears externally, and on examination, presents the characters of carcinoma. 3. Reproduction may be accomplished in the tissue of the cicatrix itself, by the development of tuberiform, or infiltrated carcinoma.

To whichever species the original growth belong, the secondary formation is ordinarily encephaloid; hence, probably, the observation that consecutive, run their course more rapidly than primary, tumors.

§ 3. *Pathology.*

(A.) Reference has been made in a preceding page to the disproportionate frequency of cancer in some organs; for instance, the female mamma, the uterus, stomach, liver, and testicle. The cause of this particular proneness to the affection has naturally been made a subject of inquiry. Dr. Hodgkin conceives that, in respect of the genital apparatus of the female, the production of the disease is probably favored by the intermitting and periodical variations to which the functional activity of the organs composing it is

liable. But the comparative rarity of carcinoma of the ovaries, bodies participating in all the peculiar and sudden changes to which the other female organs are exposed, seems to shake very materially the plausibility of this doctrine; besides, the alternations of activity, and of total inaction, are still more frequent in the brain than in the genital apparatus, yet the cerebral substance is, comparatively, rarely visited with carcinomatous disease. According to the same writer, some parts appear to be predisposed to become the seat of cancer, in consequence of their being possessed of a low or imperfect degree of vitality; and the thymus gland, the supra-renal capsules, the mamma, and *nævi materni*, are adduced as structures illustrating the opinion. We are not acquainted with any facts proving that such predisposition exists on the part of the thymus gland, or renal capsules; and we believe with Rayer, that the disease has not been observed in the latter, unless as a co-existence with nephritic or hepatic carcinoma. The vitality of fibrous tumors falls vastly short of that manifested by accidental erectile tissue; yet we have seen the conclusion respecting the immunity of the former growths from cancer, to which clinical study has led very distinguished observers, and, on the other hand, noted the well-ascertained fact of the frequent development of carcinoma in the latter. And if low vitality be so favorable a condition for the production of the disease, how comes it, that of all the splanchnic viscera the stomach is most frequently carcinomatous? M. Cruveilhier, widely differing from Dr. Hodgkin, affirms that a superabundance of vitality and developmental energy exercises an unequivocal influence on the predisposition to cancer; an opinion quite as hypothetical as its converse.

A very prevalent mode of accounting for the greater frequency of the disease in the mamma and testicle is by referring to their constant exposure to mechanical injury;

the theory has spread from the schools to the vulgar, who almost invariably ascribing the affection to a blow or some other local violence, confirm in their turn the scholastic prejudice. Now in the majority of cases where such causation is voluntarily declared by the patients, or forced from them by the speculative pathologist, close sifting of their previous history distinctly proves either that the morbid growth had commenced before the receipt of the injury to which it is attributed, and that in truth the only relation between them is that the patient first discovered the diseased induration in looking after the effects of the blow; or that the occurrence of the accident is purely imaginary. We have in several instances assured ourselves of this. Besides, among other illustrations, if local injury play so important a part in evolving the disease, is it not fair to infer that carcinoma of the cervix uteri should be materially more frequent in prostitutes than in women of regular life? yet such is shown to be by no means the fact by the inquiries of Breschet and Parent Duchatelet, and by the experience of all Parisian practitioners who have had occasion, in an official capacity, to treat the former class of females on a large scale.

It follows from these considerations that the cause of the greater tendency of some organs than of others to cancerous deposition is unknown.

(B.) *Anatomical Course.* — (a.) The disease may, in its material manifestation, be confined to a single organ from the outset to the fatal termination; no organ but that originally affected presenting on post-mortem examination any traces of cancerous formation.

(b.) The disease originates in a single organ or tissue, whence it seems to spread, as from a centre, to a multitude of parts; the latter are said to be affected with *secondary* cancer. Now the mechanism by which the disease is propagated must obviously vary, according as parts adjacent

to or distant from the primary growth are the consecutive sufferers. In the former case the propagation is effected by the progressive interstitial deposition or infiltration of the morbid matter in tissues naturally continuous or contiguous; or parts simply placed in juxtaposition or approximation may, according to Dr. Hodgkin, without the pre-establishment of adhesion contaminate each other. As instances of the latter mode of contamination, cases are referred to, in which an ovary, the mesentery of the liver being the seat of a malignant tumor, the parts in contact with it, whether convolutions of intestine or abdominal parietes, become similarly affected. In such instances, it might be questioned, adds this distinguished observer, and Rayer coincides with him, whether some principle, capable of deranging the nutrition of the part secondarily affected, does not pass by imbibition.

The occurrence of cancerous formation in distant organs, when an effect of pre-existing disease elsewhere, seems only intelligible as a result of transmission by the lymphatic or venous systems. The condition of the lymphatic structure in communication with a cancerous tumor varies. In some cases it is, to all appearance, normal; in the vast majority of instances, when the disease has existed for any length of time, the glands are affected with simple or cancerous induration¹, while the vessels leading to them are either filled with the heterologous matter, or, as is more common, no modification is discernible in their anatomical state. Now when the tubes are themselves loaded with cancerous substance, and are, for example, traceable so loaded from the diseased organ even to the thoracic duct²,

¹ Of a mass of glands in connexion with a cancerous tumor, those nearest the latter are sometimes, it is said, found distinctly carcinomatous, while the more distant are simply enlarged from irritation.

² A. Cooper, Hourmann.

without any evidence existing of the matter being a product from the walls of the tubes themselves, the implication of the lymphatic system is evidently the result of absorption. But when the glands are cancerous and the connecting tubes in the natural state, the condition of the former is not thus so satisfactorily explicable. The difficulty may, it is alleged, be obviated by supposing the secondary formation induced by congestion of the glands, itself excited by the irritation attending the progress of the primary growth. We are at a loss to understand, why the vessels themselves, in closest proximity to the disease, should not suffer, were this conjecture well-founded: the analogy of common or venereal irritation will not fairly apply here. Maunoir observes that in the advanced stage of encephaloid, lymphatic glands unconnected with the tumor by vessels sometimes become affected, and Sir A. Cooper has seen the axillary glands of the opposite side diseased in cancer of the mamma. In these cases the lymphatic carcinoma must be admitted to occur independently of the existing growths, unless the statement of Scarpa, that the cancerous ichor sometimes passes circuitously along the anastomosing lymphatic vessels be well founded.

As it is necessary to admit that the process of absorption, as a part of nutrition, is constantly going on in cancerous growths, it may be inquired why distant contamination does not occur from their earliest deposition. A parallel case may be cited. The pyogenic membrane or enclosing cyst of abscesses is by all admitted to be an absorbing and secreting agent, yet in how few cases of abscess does pus find its way into the circulation. Both facts may be explained by supposing that these vessels normally exercise a decomposing action on the purulent or cancerous matter, which they cease to do on some occasions, admitting it then into their interior with its natural properties.

But the occurrence of secondary carcinoma, in localities

free from lymphatic communication with the seat of a primary growth, remains to be explained. In these cases it appears hardly possible to doubt that the venous system is an agent of translation: while M. Cruveilhier affirms that such is the case with all the earnestness of conviction, Müller simply admits the possibility of the absorption and diffusion of the germinal nuclei giving rise to secondary formations. If it be true that we still want the material demonstration of this — if no investigator has yet discovered the cancerous matter actually *in transitu* with the blood in the veins leading from one diseased organ to another — still the following arguments may be adduced as affording strong presumptive evidence in favor of the reality of such transmission. 1. Cancerous matter exists in a multitude of cases in the veins of the diseased part; now this is obviously a most favorable circumstance for its circulation with the returning blood. 2. The rapidity of the successive development of the disease in different organs, sometimes observed, seems only producible by the agency of a fluid which, like the blood, pervades them all. 3. The liver and lung, the two organs in which foreign bodies introduced into the circulation are almost invariably observed to stagnate¹, are by far the most frequent seat of the secondary development of carcinoma. 4. Secondary cancer in the liver and lung occupies the same elementary seat as pus formed in those organs consecutively to the existence of suppuration in a distant part of the frame (metastatic abscesses.) The granules of the former organ are in both instances the element affected². Dr. Carswell, arguing for the primary vitiation of the blood, affirms that the fact of absorption is disproved by minute anatomical details; but gives us no information as to the presumed

¹ Cruveilhier, Magendie, &c.

² Cruveilhier.

nature of these. Dr. Hodgkin is persuaded that the consistence of the matter is sufficient evidence "of its not having been transported along the vessels in which it is found," (of course this applies *à fortiori* to secondary tumors in the parenchymata) and believes its existence in the veins and lymphatics to be the result of "inflammation of the malignant growth and the natural structures connected with it." The fact of inflammation occurring under these circumstances is unestablished; we shall presently recur to the objection founded on the consistence of secondary formations. According to Müller the presence of cancer in the venous capillaries "appears simply to indicate inflammation of those vessels:" a notion discordant with the well-established fact, that the morbid matter is found in perfectly healthy portions of the venous system.

Nevertheless some apparently serious objections may be raised to the doctrine of venous transmission. If such, it may be urged, be the mechanism of the production of carcinoma in distant organs, why is such production not a constant phenomenon? why should cancerous disease ever terminate the existence of individuals without having manifested itself *materially* in more than a single spot? A satisfactory answer cannot in the present state of the science be easily found. It must, however, be recollected, that the presence of the morbid substance in the veins has not been proved to be a constant condition of its existence in every form of the disease; secondly, that when the minute veins are blocked up, the circulation in the portions of tube immediately in front of the obstruction can only go forward by anastomotic communications; and that, thirdly, the morbid substance is in many instances completely cut off from the general circulation by sanguineous concretions. Of this last fact published engravings of carcinoma furnish examples. Another objection to this doctrine may appear in the multitude and large size of secondary formations; it

is physically impossible, it may be alleged, that these should have been the produce of absorption from a mass, itself smaller than many among them, and which at no period of its growth suffered apparent diminution of bulk. But it is not meant in the remotest degree (and this is the answer to those who object to the origin of secondary carcinoma in absorption on the score of its consistence) that consecutive formations are composed of the actual substance of the primary mass, though even this does not seem, from the evidence of infinitely rare cases, to be impossible; the micrography of cancer shows that the translation and deposition of a few cells only from the original nidus might lead to the development of the largest mass; each cell is in itself *the possible embryo of a tumor*. There is yet another fact, apparently subversive of the notion of venous transmission. The detritus and ichor of carcinoma have been injected into the veins of animals, but no development of cancerous structure has resulted from the experiment. Granted, but this simply proves — and it does so perhaps as conclusively as any other adducible argument — the absolute necessity of predisposition for the production of the disease: without this even its material constituent manifests itself only as an irritative agent.

Some curious facts are to be found in authors which at least justify what has been just said respecting the *metastasis* of cancerous tumors. The following is an abridged account of one of these, related by Recamier on the authority of Parent Duchatelet. A woman, after having for a length of time suffered from a tumor in the breast possessing all the characters of non-ulcerated scirrhus, and presented the symptoms of the cachexia in so marked a manner that Dupuytren not only refused to remove the disease, but dissuaded M. Parent from the use of leeches, was seized with remittent cephalalgia of intolerable violence: at the same time the mammary growth ceased to be painful

and disappeared almost completely. Apoplectic symptoms with hemiplegia supervened, were combated by the ordinary means, and recurred twice before the patient's death, which took place ten weeks after the first apoplectic seizure, and two years after the supervention of the symptoms in the mamma. On post-mortem examination a tumor of the size of a nut, and possessing the characters of carcinoma, according to the testimony of Cruveilhier, was discovered floating, as it were, in a quantity of diffuent brain. The case is narrated with very satisfactory minuteness.

The diseased condition of the *nerves* adjoining cancer, already adverted to, has been cited by Lobstein as affording proof that the affection may be transmitted to distant organs through the medium of those cords. This hypothesis has not sufficient plausibility to require serious examination.

Numerous writers, apparently in despair of discovering the true mechanism of secondary cancerous development, have, like our forefathers in respect of metastatic abscesses, contented themselves with the verbal subterfuge, that it is accomplished in virtue of the intimate physiological connexion or sympathy subsisting between parts. The mamma and uterus are adduced as organs exemplifying this mode of propagation of the disease. The illustration is singularly infelicitous. Those who have examined the bodies of many individuals dying with uterine cancer are aware that secondary development in distant parts is, comparatively, one of its rarest concomitants; and that when such development takes place, the mamma is in the vast majority of cases spared. In a very considerable number of autopsies of females dying in all stages of uterine carcinoma, we have not observed a single instance of similar secondary growth in the mamma. The accurate Bayle declares, as the result of his experience, that the uterus is ordinarily perfectly free from organic disease in cases of fatal mammary scirrhus; and this even in women who have towards the close

of life had an abundant fetid vaginal discharge : the existence of such discharge has probably engendered the error to which we refer. Dr. Blundell, too, mentions¹ that he has never seen a coincident deposition in the mamma and uterus. Further, all are agreed in regarding the liver and spleen as intimately connected physiologically ; yet so extremely rare is the coexistence of cancer in these organs, that Breschet not long since asserted that such combination had never, to his knowledge, been observed. Of eleven cases of cancer of the liver, related in Andral's Clinique, one only was attended with similar formation in the spleen ; though in almost every instance there were other organs beside the liver affected with the disease. It is a curious fact, too, that in Velpeau's celebrated case, while the liver contained several hundred cancers, and hardly a part of the frame had escaped contamination, the spleen was unaffected. The liver was not affected in one half the cases of cancerous disease of the spleen we have found in authors ; and even if the number of cases were greater, it must be recollected that no matter where the primary disease exists, the liver, as has just been stated, is the organ most prone to suffer consecutively. These facts suffice to overthrow the doctrine of sympathy.

The question has arisen, whether any particular organs or tissues are incapable of becoming the primary seat of the disease. Individual experience can scarcely be expected to furnish a correct answer to a question of the kind. We have already exposed the fallacy of Scarpa's notions on this point. Dr. Carswell has never met with carcinoma of the pancreas, muscular, venous, and arterial tissues, serous, mucous, and fibrous membranes, without the disease having been communicated from a neighboring organ. But Bayle mentions his having seen primitive cancer of the

¹ Diseases of Women, p. 161.

pancreas in a few instances; and he is not likely to have been mistaken in the nature of the affection, as he is at much pains to distinguish true scirrhus of the organ from other diseased indurations: M. Recanier also relates a case in which the pancreas was the sole organ affected. Secondly, though primary affection of the mucous membranes is extremely rare — the disease originating either in the subjacent cellular tissue, or in the muscular tunic, where such exists — yet we are disposed from our examinations of certain cancerous stomachs to believe with Scarpa, Cruveilhier, and others, that the morbid action commences occasionally with the mucous tissue. Thirdly, though cancerous tumors of the internal surface of the dura mater ordinarily originate in the cellular tissue between that membrane and the arachnoid, yet observers of eminence affirm that the morbid growth may sometimes be distinctly traced to the fibrous substance itself. Cancerous tumors are produced from the periosteum of the cylindrical bones, the latter being themselves perfectly free from disease; and sometimes encephaloid “splits the sclerotic into two lamellæ, distinctly originating in the interstitial substance of that coat.”

Bayle states that the muscles of locomotion are not observed to be affected with primary cancer, in which respect they differ from those of organic life. The Fasciculi of Cruveilhier, however, prove that small cancerous masses may be developed secondarily in the muscles of animal life, without any direct continuity with the original disease; and encephaloid originates even primarily in the same situation.

The tissues and organs which are very rarely affected primarily, may easily be enumerated without much apprehension of error: to this category would belong, in addition to the parts named by Dr. Carswell, the spleen, the larynx, the heart, and the lymphatic glands. It has indeed been a

currently received opinion that the affection is always secondary in the last mentioned parts; that carcinoma is occasionally, however, exclusively developed in those organs, is a fact supported by the testimony of Walther, Wardrop, Travers, Recamier, Carswell, Littré, Warren, Jäger, and others. We are not acquainted with any instance in which the fibro-cartilaginous, ligamentous, or tendinous tissues have been found cancerous, except as a result of communication from a contiguous tissue.

Are there on the other hand, any structures in which, though liable to become the primary seat of the disease, secondary development is not observed to occur? This query must decidedly be answered in the negative, more especially with regard to extension by contiguity of tissue. Secondary affection of some organs, as a result of its existence in distant parts, is nevertheless remarkable for rarity: M. Cruveilhier states that consecutive cancer of the ovaries is thus characterized: and secondary affection of the uterus is, though more frequently observed, still extremely uncommon.

Secondary carcinoma is, in the majority of cases, of the encephaloid species; scirrhus is, however, far from uncommon, and colloid has been met with. The disease under these circumstances usually assumes the disseminated tuberos form, especially in the liver, lungs, and bones. On the subpleural pulmonary surface it frequently manifests itself in the form of flattened cartilaginous-looking patches.

The consecutive development does not appear to spread from organ to organ according to any regular law. Published cases exhibit, on the contrary, every variety of combination of parts secondarily diseased. And in respect of the two organs most frequently thus affected, though the liver ordinarily suffers more extensively than the lungs, and though when the disease exists in both, its development in the former seems almost always (when the point is

capable of decision) to have been prior to that in the latter, yet this is by no means invariably observed.

With respect to the relative tendency of different organs, when cancerous, to infect the economy generally, there can be little doubt that the mamma holds the first place. It is difficult to point out any special cause for this peculiarity; indeed in all probability none such exists. M. Cruveilhier conjectures that it may depend on the fact that even extensive disorganization of the mamma does not directly produce disturbance of any important function, a circumstance which allows the disease full time and scope for complete evolution. The justness of this suggestion could only be satisfactorily ascertained by comparing the mean duration of cancer of the mamma with that of other organs: these quantities are unfortunately unknown. Numerous *à priori* considerations might be urged against M. Cruveilhier's hypothesis. On the other hand uterine carcinoma rarely entails general contamination of the system; to such a degree is this true, that M. Cruveilhier makes it the ground for questioning whether in a case of coexisting encephaloid of the brain and of the pultaceous cancer of the uterus, the former, though — judging from symptoms — developed after the latter, in any wise depended on its prior existence. As the mean duration of uterine cancer appears from the inquiries of Mr. Lever to be about twenty months, the rarity of consecutive development in its course argues in favor of the opinion of the French pathologist just stated. This same experienced observer represents carcinoma of the rectum as being habitually unaccompanied with general infection.

The different species of cancer exhibit unequal proneness to the production of secondary growths. Observers agree in assigning colloid the lowest rank in this respect: that scirrhus holds the first would appear to follow from the fact that this is the species of far most frequent occur-

rence in the mamma. Nevertheless encephaloid tumors, especially as developed in the extremities, stomach, and testicle, may be said to possess superior influence. Numerical evidence on this, as on almost every other point in the history of carcinoma, is yet a desideratum. It is assuredly more common to find a number of organs in the same individual affected with encephaloid than with scirrhus: but it does not hence follow that the primary disease was of the encephaloid type, and many such cases of multiple formation may in truth belong to the category alluded to in the following paragraph.

(c.) The reader has probably felt inclined to ask, where is the proof that, in the cases of general infection adverted to, the growths, which we have considered to be developed consecutively to another or others, really possess such relation thereto? Is it not quite as likely that, in some cases at least, the presence of heterologous growths in numerous organs may depend on their simultaneous development? Unquestionably such is the truth in a greater share of instances than the language of reporters of cases would lead us to suppose. There can be no doubt that internal cancer is frequently described as consecutive to an external one, (especially when the latter has been removed with the knife, and the former has not manifested its existence by symptoms until after the operation) when no proof of its not having co-originated with it can possibly be adduced. The fact of succession in the development of the disease seems only capable of demonstration (exclusively of cases of extension by contiguity of tissue) under the following circumstances: 1. when the morbid growth occurs in the skin, subcutaneous cellular membrane, or other situations, where its origin and progress may be traced with the eye and hand; 2. when the lymphatic vessels and glands communicating with a diseased mass themselves become affected. While speaking in general terms we are obliged

to exclude the condition of the heterologous matter and the existence of symptoms as elements for forming an opinion, although particular instances do arise in which either may be decisive of the question. Thus neither the size, the consistence, or the number of masses in a given organ will always throw any material light on the matter; their growth may have been slow or rapid, their consistence may be soft *ab initio*, a number of tumors may be produced within as short a period as a single accumulation. We obtain no more satisfactory guidance from symptoms; carcinoma may exist for a length of time in the most important organs — witness the brain, the liver, the lungs — without producing the least functional derangement; experience even proves that two-thirds of the surface of the stomach may be destroyed by cancerous ulceration without — provided the orifices are left intact — producing any general or local symptoms of sufficient intensity to direct the attention of the patient or his medical attendant to that important viscus.

(c.) The condition of the solids and fluids of subjects dying with cancerous disease has scarcely been investigated. Lymphatic and visceral secondary contamination are the only lesions recognised as attendants on the progress of the disease; whether any other exist, and bear the same relation to the original affection as the secondary lesions of phthisis discovered by the philosophic labors of M. Louis, remains to be ascertained. The materials for the inquiry can only be obtained by long and laborious clinical research.

M. Louis found that the mean volume of the heart was less in subjects dying from cancer, especially of the stomach and uterus, than in those succumbing under any other disease; and that while the aorta measures $34\frac{1}{2}$ lines (Fr.) in width at the edge of the sigmoid valves in subjects dying of acute diseases between the ages of 30 and 40, and 32 in

the victims of phthisis, it only measures 30 in carcinomatous subjects of the same age¹.

Tubercle and cancer rarely co-exist. In fifty-two autopsies of cancerous subjects collected from various sources we found but three examples of the anatomical characters of phthisis. The difference of the ages at which the two diseases are most prevalent would lead us to expect a result of this kind, independently of any influence which the formation of one may have in excluding that of the other form of morbid matter. It is worthy of remark, that in the three instances of coexistence referred to, the cancerous affection was of the scirrhus species, and the mean age of the subjects thirty-seven. The absence of tuberculous disease in all the cases of encephaloid (thirty-one in number) argues strongly against the opinion of those who either consider the latter allied to scrofula, or with Mr. Travers actually regard it as cancer modified by a strumous constitution: indeed we have never yet met with a solid argument in support of this doctrine.

The quantity of blood in circulation diminishes; and that what remains is materially altered in composition, the change of its color, and of the solids it nourishes, and the undue proportion of serum in that effused in hæmorrhages, incontestably show; but the extent of this alteration, its precise nature, its relation to different stages of the disease, above all whether the microscopical elements of carcinoma mingle with the fluid, are all unknown.

(D.) ETIOLOGY. (a.) *Specific cause*.—Until of late years it was pretty generally believed that cancer might be transmitted from individual to individual by means of an inoculable or even an infectious principle. The grounds for the belief consisted on the one hand of a few ill-authenticated statements in the older writers respecting the de-

¹ Rech. sur la Phthisie, pp. 54, 56. 1825.

velopment of the disease, in persons presumed to have been previously healthy, as a result of close and habitual contact with cancerous subjects; on the other of an experiment by Peyrilhe, in which that surgeon introduced some cancerous matter under the skin of a dog, and produced, as he implies, a carcinomatous ulcer. Admitting the authenticity of the first order of facts, they can only prove the fact of coincidence. As to the experiment of Peyrilhe, the only ascertained results were violent inflammation and gangrene; the ultimate effect was not known, as the animal was lost sight of.

The accurate observations of modern pathologists have settled this question in the negative. First, Alibert, Bielt, and several pupils of the Hôpital St. Louis inoculated themselves with the ichorous discharge of cancerous ulcers without suffering any particular effect from the operation: Secondly, Dupuytren introduced pieces of cancerous tissue into the stomachs of animals¹, and injected the matter from ulcers into the veins and splanchnic cavities without producing any result except those caused by irritating substances generally: Thirdly, among a considerable number of men who had habitual intercourse with women affected with ulcerated cancer of the cervix (of which the existence was established by post-mortem examination) not one presented the slightest symptom of such disease² (Bayle):

¹ Gooch relates the "history of a cancerous disease, which arose from drinking some liquor impregnated with the matter that issued from an ulcerated cancer;" (Cases and Remarks, &c. p. 39.) but the inference drawn from this case is not justified by the narrative.

² In a single instance only, an eruption of small pimples occurred at the extremity of the penis immediately after coition, but it disappeared spontaneously in a few days, and differed in no wise from the eruption occasionally produced by acrid leucorrhæal discharge.

Fourthly, surgeons have frequently wounded themselves in the extirpation and dissection of cancerous growths, without suffering in consequence from carcinomatous disease. (Jäger.)

(b.) *Predisposing causes.*—To this class belong all conditions which are supposed to modify the organic state of individuals in such manner as to prepare them, as it were, for the influence of the direct causes of disease.

1. *Age.*—The different species of carcinoma may originate at every period of existence. In a remarkable case described by Billard¹ development of scirrhus had taken place in the heart during intra-uterine life; under the head of Meningeal Encephaloid we shall have occasion to refer to two cases in which that affection existed at birth; and Mr. Travers² has figured a remarkable specimen of congenital encephaloid of the eye, observed by himself and Sir A. Cooper when the infant was eight months old; at birth the eyeball was as large as a walnut. M. Cruveilhier has, on the other hand, known uterine cancer manifest itself at the advanced age of eighty-four. The general sense of authors on this point, however, is that the disease rarely occurs in early life, seldom originates in old age, and is especially frequent in both sexes between the ages of thirty-five and fifty. As the accuracy of this notion had never been tested statistically, we felt desirous of supplying the very obvious desideratum in our knowledge of the general laws of the disease; and accordingly obtained permission to examine the returns of deaths supplied to the Registrar-General in pursuance of the late Registration Act³. In applying to this source there were some partic-

¹ *Traité des Maladies des Enfants*, Pl. viii. Fig. 2. 1828.

² *On Dis. of the Eye*. Pl. v. Fig. 2.

³ For the Registrar-General's permission, we are indebted to the obliging interference of Mr. Farr, and seize the opportunity of expressing our gratitude to that gentleman not only for this kindness, but for several suggestions regarding this branch of our subject.

ular advantages not usually enjoyed by those who have endeavored to determine the influence of age on diseases by statistical evidence; their cases have, with few exceptions, been collected in hospitals, consequently among individuals of a particular age, of a certain station in society, and usually exposed to *peculiar* influences destructive of health. The Registration includes persons of every rank and of every age; in using the documents it furnishes, we were consequently protected from numerous sources of error. Fortunately, too, for our present purpose, cancerous disease, before it proves fatal, exhibits its characters in so marked a manner, as to leave little apprehension of mistakes in diagnosis having occurred.

To the period of death, and not of development of the disease, the following tables of course immediately refer; but as the ages are arranged in decennial periods in our proportional tables, and the mean duration of cancer of all kinds, in all organs, and in subjects of every age, does not in all probability much exceed two years and a half, the error would be slight were the results applied to the period of development. Twelve hundred cases seemed sufficient for obtaining the rate and law of mortality; to this number we accordingly limited our extracts. Their mode of distribution is seen in the following table:—

TABLE I.

Showing the absolute mortality from Carcinoma in both sexes and at all ages.

AGE.	MALES.	FEMALES.	BOTH SEXES.
1 month			
2 " . .	. .	. 1	. 1
3 and under 6	. .	. 1	. 1
6 " 9			
9 " 12			
Years.			
1 " . .	2	1	3
2 " . .	1	4	5
3 " . .	. .	1	1
4 " . .	. .	1	1
5 and under 10	3	2	5
10 " 15	1	4	5
15 " 20	3	5	8
20 " 25	4	2	6
25 " 30	1	13	14
30 " 35	6	23	29
35 " 40	15	43	58
40 " 45	19	77	96
45 " 50	23	98	121
50 " 55	34	130	164
55 " 60	35	120	155
60 " 65	44	110	154
65 " 70	45	88	133
70 " 75	35	69	104
75 " 80	30	49	79
80 " 85	16	28	44
85 " 90	1	8	9
90 " 95	2	1	3
95 and upwards	1	. .	1
Totals	321	879	1200

From this table we learn the proportional numbers of individuals dying from carcinoma at each specified period of life; but were we to conclude that these numbers represent the relative tendency to the disease at different ages, we should fall into a very serious error. It appears for example that 250 females die of cancer between the ages of 50 and 60, while 118 perish between those of 70 and 80;

but if the total number of females living of the former age were double that of those alive of the latter, the proportional mortality at both decennial periods of life would be as nearly as possible equal, instead of being in one of them double that of the other. In a word, in order to ascertain whether particular ages exercise any influence on the development of the disease, we must compare the absolute mortality with the total number living at each age. This we have been enabled to do from the population estimates of Mr. Rickman¹, and present the reader with the result in the following table:—

TABLE II.

Showing the proportion of deaths from Cancer in 1000 living of each sex at the different ages.

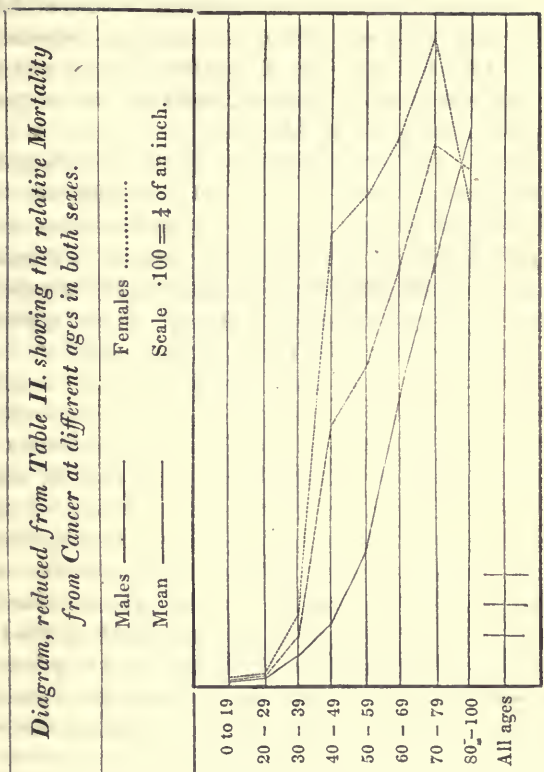
AGES.		MALES.	FEMALES.	MEAN.
Under	5	·006	·017	·012
5 and under	10	·007	·004	·006
10	15	·002	·010	·006
15	20	·009	·017	·013
20	30	·010	·024	·017
30	40	·058	·152	·105
40	50	·140	·983	·561
50	60	·290	1·066	·678
60	70	·636	1·192	·919
70	80	·935	1·421	1·178
80	100	1·207	·973	1·089
All ages		·103	·245	·174

¹ Rickman, *Population Abstracts*, vol. i. Preface, p. 38. Table II. was calculated by assuming as a basis the annual rate of mortality from cancer in 1837, then deducing from Table I. the relative proportion of deaths from cancer at decennial periods of life, next ascertaining from the population returns the relative numbers living at those periods, and dividing the former by the latter. Thus the female deaths from cancer at the age of 20 to 30, divided by the number of women living at that decennial period gave ·024 per 1000,—the relative mortality from cancer at that age. There are some other intermediate steps in the calculation, which it is not necessary to state particularly.

A glance at this table will suffice to show the inaccuracy of the commonly received opinion, that the tendency to cancer reaches its maximum between the thirty-fifth and fiftieth years. The mortality, on the contrary, goes on steadily increasing with each succeeding decade until the eightieth year; after that period the results are, from causes which it is needless to enumerate, liable to slight error, and may therefore be omitted in the general survey. It is remarkable that the mortality from this disease is lowest at the same period of life as the general mortality from all causes indiscriminately, namely from the tenth to the fifteenth year.

The law of mortality differs strikingly in the two sexes : the most general character of this difference being the greater regularity of increase with advancing age among males. Passing over the first twenty years, at which period the number of cases is probably too small to admit of very useful comparison, we find, it is true, that the number of deaths from *æt.* 30 to 40 is in both sexes about six times greater than from *æt.* 20 to 30; but here the similitude of increase ceases; in the next decennial period the deaths among females augment more than sextuply, while the mortality of males only increases two and a half times, &c.

These facts are, we trust, rendered easily comprehensible by the following diagram constructed on the plan recently employed by Mr. Farr, in demonstrating the law of mortality in epidemic cholera. Number is here represented by space.



The fact likely to be most strongly impressed on the reader by this diagram is the enormous and abrupt increase of female mortality between the ages of thirty and fifty: an increase which accounts for the erroneous notion that the disease reaches its maximum frequency at that period of life, and lends support to the current belief respecting the connexion of uterine and mammary cancer with declining activity and cessation of the genital functions. We have ascertained the apparent reality of their connexion still further by comparing our results with a table showing the intensity

of fecundity of women at the different periods of life in Sweden and Finland¹: from this curious document it appears, that the intensity of fecundity, which had been pretty uniform from æt. 25 to 40, suddenly falls to $\frac{1}{5}$ of its previous amount from æt. 40 to 50.

The *mean age* of the 1200 cancerous subjects at death was 59·4 years in the male sex; 56·1 in the female.

The different species of cancer are far from being equally common at all ages; scirrhus is essentially a disease of adults, while encephaloid is the form usually assumed by the morbid growth in young subjects; colloid appears so far to have been only observed in adult individuals.

Again, the locality of carcinoma is manifestly somewhat under the influence of age. Previously to puberty, the disease is most common in the eye, the lymphatic system, the brain², and the cellular membrane of the extremities; the uterus, mamma, stomach, liver, intestines, and bones enjoy comparative immunity until the thirtieth year. Exceptions to this rule are no doubt met with; Dr. Carswell is of opinion, that the exceptional occurrence of the disease during infancy or early youth in the latter class of organs depends upon their premature or præternatural functional excitement, and the statement appears to hold good in respect of the uterus, testes, and ovaries.

¹ This, which is we believe the only table of the kind in existence, may be seen in Milne on Annuities, vol. ii. p. 582. It is highly probable that the law of fecundity is the same in this country; at least the period of menstruation is sufficiently close in the two latitudes to render the existence of any material difference in this respect exceedingly unlikely.

² Cruveilhier affirms that cancer of the brain is the "apanage of advanced age;" but Andral gives a table of forty-three cases, among which eight occurred before the twentieth, and eighteen before the thirtieth year. (Clinique Médicale, t. v.) Dr. P. Hennis Green has recently published a case of encephaloid of the brain occurring in a child aged twelve. (Lancet, Feb. 15, 1840.)

2. *Sex.* — The relative frequency of the disease in the two sexes may be learned from Mr. Farr's published tables of the causes of death throughout England and Wales during the last half-year of 1837¹. Of 1228 individuals who died of carcinoma during that period, 355 were males, 873 females. Though a certain degree of numerical superiority exists on the side of the female population, yet it is quite insufficient to account for the much higher quota of cancerous deaths in that sex; for, by calculating the rate of mortality in proportion to the numbers living of each sex, we learn that the annual mortality from the disease is $\cdot 103$ per thousand in males, and $\cdot 245$ in females: the excess on the side of the latter is therefore as nearly as possible as $2\cdot 5:1$. This difference is the more remarkable from the fact that the mean rate of mortality from all diseases is $20\cdot 8$ per thousand among males, while it is $19\cdot 7$ among females.

3. *Temperament.* — Of 44 cancerous subjects, whose original constitutional bias was sufficiently marked for purposes of observation, 20 were of lymphatic, 12 of sanguineous, 8 of bilious, and 2 of nervous temperament. This numerical result, obtained from personal observation by M. Ferrus, has been since quoted as decisive of the influence of the lymphatic constitution on the disease. But (setting aside the smallness of the numbers from which the conclusion is derived) no inference of any kind can be drawn from them, as the proportional frequency of the different temperaments in the individuals forming the floating population of the hospital, where the cases were observed, is not known. And indeed as the hospital in question, the Salpêtrière, receives female patients only, in whom the lymphatic temperament is probably the most usual, unless

¹ First Annual Report of the Registrar-General, &c. Appendix P. 1839. 8vo edition.

such temperament were actually prophylactic against carcinoma, the result could be none other than that obtained by M. Ferrus. Connected with this opinion is the notion, likewise unproved, that encephaloid is of most frequent occurrence in scrofulous subjects.

Sabatier conceived he had ascertained, from the experience of years, that women of high color and sanguineous temperament were more subject to mammary cancer than those of different constitution¹. Mr. Lever has numerically proved a similar position in respect of carcinoma of the uterus².

4. *Habitation of town or country.*—Among the few positions stated by Breschet to be thoroughly established respecting the etiology of cancer is the following: "this disease is as rare among persons employed in agriculture, and the country population generally, as it is common among the lower orders of the population of large towns."

The soundness of this doctrine may be tested by the tables of Mr. Farr. From these we learn, that in the metropolis 185 deaths occurred from cancer, while five counties of nearly equal population, Cornwall, Dorsetshire, Devonshire, Somersetshire, and Wilts, furnished 126 deaths from the same disease. But the excess, on the part of London, is not even so marked as would on first sight appear: for, calculating from the estimated populations in October, 1837, the annual mortality is .206 per thousand in the capital, .143 per thousand in the counties. And, again, the number of deaths from this affection in a number of our principal manufacturing towns (Leeds, Liverpool, Manchester, Sheffield, &c.), with a total population of 1,762,710,

¹ Médecine Opératoire, t. ii. p. 276. Parr (Dict. in voc.) affirms that he encountered the disease most frequently in persons of dark, cadaverous, and blue-brown complexion! Rather a singular union of tints.

² Med. Chir. Trans. vol. xxii. 1839.

exposed *per eminentiam* to what are esteemed the insalubrious conditions of the life of town artisans, is 152; while in a number of rural districts, containing 1,776,980 souls, 163 individuals fell victims to the disease. Finally, comparing the deaths from cancer in the metropolis and provincial towns on the one hand, with those in all the rural districts referred to on the other (337 in the former and 289 in the latter), we obtain an annual mortality of $\cdot 189$ per thousand in large towns, and of $\cdot 165$ in the country. The character of this result is rendered more distinct by comparing it with the rate of mortality, from all diseases indiscriminately, in the same towns and counties: the annual mortality in the former is 27 per thousand; in the latter 16.9 per thousand, showing a remarkable minority in favor of a country life.

Hence it appears that a town life is far from exercising any serious influence on the production and mortality of cancer. And if the fact be taken into consideration, that many cancerous subjects, who have acquired the disease in the country, remove, as an *ultima spes*, to the large town in their vicinity for the sake of the professional aid it affords, die and are registered there, and consequently swell the sum of deaths from the disease in cities, while they, *pro tanto*, diminish it in counties, the innocuousness in this respect of a city habitation, will appear in still stronger relief¹.

A curious fact connected with the question of metropolitan and provincial frequency of cancer is, that females furnish the excess in towns, whenever such excess occurs; this is seen in the following table: —

¹ The general result above given is, we are enabled to state, confirmed by the registration of 1838.

	Metropolis and towns.	Counties and Rural Districts.
Males.	45	42
	29	53
	—	—
	74	95
Females.	140	82
	123	110
	—	—
	263	192

A number of *à priori* ways of explaining this peculiarity might easily be advanced, but the reader will probably agree with us in the propriety of suppressing any such hypotheses. One thing is certain, that the law in respect of cancerous diseases differs from that regulating the sexual ratio of general mortality in towns and country. The following numbers, representing the total deaths in the cities and counties referred to, show that the mortality of the former exceeds that of the latter by very nearly the same amount in each sex.

	Cities.	Counties.
Males	24,402	14,841
Females	23,551	14,582

The share of the total mortality caused by cancer, in the cities and the country comparatively, is exhibited in the following table :—

	Population in October, 1837.	Total specified Deaths.	Deaths from Cancer.	Proportion in 1000 Deaths.
Towns	3,553,161	46,849	337	7·193
Counties	3,500,750	28,036	289	10·308

This result is exactly of the kind we might have expected: as the number of deaths from diseases, propagated or increased in severity by the insalubriousness of large towns, is necessarily less in rural districts than in cities, the proportion of deaths, from affections not thus influenced, must be higher in the former than in the latter.

5 Habitation of a densely-peopled locality.—The influence of concentration of population is evidently null; in the metropolis there are 25,758 individuals to a square mile; in the counties, with which it has been compared, only 222,—a ratio completely out of proportion with that of cancerous disease in the two localities.

In order to elucidate this point further, we extracted from the registers 470 deaths from cancer occurring in the metropolis, from July 1, 1837, to December 31, 1838, and arranged according to the Unions in which they took place. By collecting the Unions into three groups, ascertained by Mr. Farr to present different degrees of general salubrity, it will at once appear whether cancer follows the same law, in this respect, as others of the most destructive maladies. The absolute number of cases is given in the following table:—

THIRTY-ONE UNIONS.	Deaths from Cancer.		
	Males.	Females.	Total.
A. 10 most unhealthy	14	82	96
B. 11 of medium salubrity .	36	103	139
C. 10 healthiest	46	189	235

But as the estimated population of these three districts, in March 1838 (the middle point of the eighteen months during which the cases occurred), were respectively 517, 288, A, 505,746, B; 787,785, C; it follows that the annual deaths from cancer were, in district A, 123, in B,

·183; and in C, ·199 per thousand living. Hence the mortality increases with the salubrity of the locality; a result which is rendered more startling by comparing it with the calculations of Mr. Farr, of the annual mortality from all diseases, from typhoid fever and from phthisis in the same districts¹.

Districts.	No. of square yards to one person.	Annual general rate of mortality per 1000.	Annual rate of mortality per 1000 from		
			Typhoid fever.	Phthisis.	Cancer.
A	57	33·21	3·24	4·78	·123
B	78	28·39	2·05	4·51	·183
C	219	21·63	1·07	3·54	·199

It is not meant to be deduced from this table that general salubrity is favorable to the production of cancer, but it clearly follows from it that the influences increasing the mortality from disease in general, and from typhoid fever and phthisis in particular, (several other affections might be added to these) exercise no such influence on carcinoma. It may perhaps be conjectured that the high quota furnished by the West-End Unions (C) may be caused by the greater prevalence of the disease among the easier classes of the community; but if the table we give elsewhere of the social position of cancerous patients possess no other utility, it at least is useful in the refutation of this notion,—the large share of individuals belonging to the lower orders is there distinctly shown, and both results are drawn from almost exactly the same series of facts. The number and extent of hospitals in each district are sufficiently equal to require scarcely any correction on this score.

6. *Trade or occupation.*—The broadest division of occupation, in a hygienic point of view, is into those connected with agriculture on the one hand, and with trade, manufac-

¹ Loc. cit. p. 113.

tures, and handicraft on the other. It may not be without utility to inquire, as far as available documents enable us to do, into the relative liability of individuals belonging to these great divisions of society to suffer from cancerous diseases. This has not been done by the comparison of towns and rural districts, for numbers of individuals engaged in agricultural pursuits may be inhabitants of towns, and *vice versâ*. We shall select for this comparison Birmingham, as furnishing the greatest excess of trading over agricultural families, and a division of the kingdom, comprising Cambridge, Huntingdon, and the southern parts of Lincoln, as exemplifying the converse condition. Calcula-

	No. of families employed in			Deaths from Cancer.
	Agriculture.	Trade, Manufactures, Handicraft.	Other families.	
Birmingham . . .	301	20,763	2,870	14
Counties named .	35,105	18,813	13,433	30

ting from the populations estimated approximatively for the period in question, the annual mortality from cancer in Birmingham — where the families engaged in trade and artisanship are *sixty-nine* times more numerous than those employed in agriculture — is $\cdot 224$ per thousand; while in the rural districts enumerated, where the latter class of family is about double as numerous as the former, it is $\cdot 178$. The advantage appears somewhat in favor of agricultural pursuits on first view; but the lower rate of mortality is evidently quite out of proportion with the vast relative minority of manufacturing families in the country districts.

In the mining districts of Staffordshire, Shropshire, Worcestershire, Northumberland, and Durham, of which the combined population in 1831 was 542,398, the deaths

from carcinoma were 42 in six months; so that $\cdot 155$ per thousand of the inhabitants perish annually from that disease. This is the lowest proportion yet noticed, and it would be still lower if we were enabled to calculate from the real population furnishing the deaths, namely that of 1837. Nevertheless, a large share of these people are constantly exposed to the influence of impure and damp air, and defective insolation. The remarkable longevity of the inhabitants of Durham generally, as shown in Mr. Farr's tables¹, may in some measure account for the comparatively small annual amount of cancerous deaths².

M. Benoiston de Chateuneuf³ has shown, in a paper on the mortality of the French infantry, that, out of a total number of 4915 deaths occurring in six years in a military body 723,741 strong, 33 were from "cancer and ulcers." Hence the annual mortality is only $\cdot 045$ per thousand from those affections; and 6.71 per thousand of the total number of deaths are thus produced. Now the rate of mortality from cancer among civilians is at least as high in France as in England. The cause of the apparently very low proportion in the army is, however, easily explained. The age at which youths are eligible for the conscription is 21; when enlisted they are obliged to serve six years (if in the infantry) and then given their *congé* — the mean age of

¹ Loc. cit. Appendix Q.

² The valuable observations of Dr. Forbes on the diseases of miners, substantiate the inference in the text. Although "there is an extraordinary superiority in the rate of mortality in the mining parishes over the agricultural and even those containing towns and crowded villages," this superiority evidently does not in any degree spring from the prevalence of cancerous disease. (See *Provincial Med. and Surg. Transactions*, vol. iv. p. 215.) The mean duration of life appears to be materially lower among miners than other laborers; this must have some influence in lessening the frequency of cancer among them.

³ *Annales d'Hygiène*, t. x. p. 239, 1833.

the great majority of foot soldiers is, therefore, twenty-three and a half. Now on referring to Table II., we find that the rate of mortality per thousand among English male civilians from 20 to 30 is only .010; hence the chances would appear considerably against, instead of being in favor of, a military life in respect of this disease. But other causes may contribute to produce this result — and the exact signification of the word “ulcers” is of course doubtful.

In the hope of throwing some light on the influence, if any, of particular kinds of occupation, we noted the trade or profession of 650 individuals as stated in the registers. The result is now laid before the reader. We have grouped together all working artisans into a single class; and individuals gaining their livelihood by labor into another: wives and daughters are ranked according to the occupation of the husband or father. This method of arrangement is justified in respect, at least, of the social position of the subjects.

MALES.		FEMALES.		Totals.
Gentlemen ¹	9	Ladies ¹	45	54
Servants	7	Servants, 36, Nurses, 8, Midwives, Dairywomen, 1	45	52
Laborers, 94, Miners, 3, Sweeps, 3	100	Laborers	94	} 211
Paupers	3	Laundresses	17	
Artisans, 60, Hatter, 1 . .	61	Paupers	27	30
Farmers	41	Artisans, 17, and Wives, 40, Dressmakers, 7 . .	64	125
Shopkeepers, 14, Auction- eer, 1, Merchants, 3 . .	18	Farmers, or Wives of . .	29	70
Tavern-keepers	4	Shopkeepers, 25, Police of- ficers' Wives, 3	28	46
Sailors, 9, Fishermen, 4 .	13	Tavern-keepers	5	9
Schoolmasters	3	Fishwomen, Sailors' wives	14	27
Soldiers	3	Schoolmistresses	7	10
Clerks, Accountants . . .	6	Soldiers' Wives	2	5
Players	2		..	6
Surgeons	2		..	2
	272		377	649

¹ By these terms are meant, it is to be presumed, independent persons, or those who follow no particular trade or profession.

No conclusion of a satisfactory kind, however, can be drawn from this table until the relative proportions of individuals living in each position or trade referred to, at the period these cases occurred, has been ascertained. Now no materials exist for the establishment of this preliminary point; and there are other conditions — of which it is next to impossible to express the influence numerically — which render the establishment of the influence of profession on disease in general, one of the most difficult and least certain points of medical statistics. We may, however, we think, justly conclude from this table that the operative classes of the community furnish a fair proportion at least, of the general mortality from the disease. The quantity of death produced by cancer in proportion to the total mortality is greater among the higher than the lower orders; this we have ascertained by comparing in the following table the proportion of cancerous death among individuals assured by the Equitable Society, who all belong to the better ranks, with that furnished by the total specified mortality of England and Wales among people of every station.

	Total mortality.	Mortality from Cancer.	Mortality from Cancer in 1000 deaths.
Persons assured in the Equitable.	4,095	43	10·5
Population of England and Wales.	141,607	1,228	8·6

But this by no means proves that the quantity of cancerous disease is greater in the higher walks of society than in the lower. The wealthier portion of the population — that assured in the Equitable — suffers infinitely less from the

epidemic and contagious diseases generated by "entassement" and the evils of atmospheric impurity than the poor; the former therefore are more open to the slow destruction of cancer. Besides, the selection exercised by the Assurance Companies, excluding deaths under twenty years, and consequently a vast mass of the population scarcely liable to suffer from cancer, reduces the mortality from the febrile exanthemata to a mere nothing, and lowers that from phthisis by more than half¹: all these circumstances tend to increase materially the quota of death from cancer among the assured.

7. *Pre-existing state of economy.* — Various writers affirm that a syphilitic taint of the constitution facilitates cancerous formation, even in organs unconnected with those primarily affected with the venereal poison. This is an assertion of which we have not been able to discover any solid proof; the comparative immunity of prostitutes from the disease in the organs most likely to suffer militates against its accuracy.

It is difficult for many reasons to ascertain whether the married or single state is most favorable to the development of the disease in females. Among 172 persons whose matrimonial condition we extracted from the registers, we found 17 spinsters, 84 married women, and 71 widows. But as the proportional number of females belonging to each of these classes in England has not been ascertained, these absolute numbers cannot lead to an accurate decision of the point. If, however, acting on the supposition that the proportions are pretty equal in different European countries, we take those ascertained by census for the Parisian population, and compare them with our deaths from cancer, we obtain the following results, which may be looked upon as an approximation to the truth: of the unmarried .07; of

¹ See Farr's Vital Statistics, p. 588.

the married 0·48; of widows 1·32 per thousand die from carcinoma. But these proportions are probably mainly influenced by the mean *age* of the different classes of women furnishing them.

8. *Mental affliction*.—Much has been written on the influence of moral misery, sudden reverses of fortune, and habitual gloominess of temper on the deposition of carcinomatous matter. If systematic writers may be credited, these constitute the most powerful cause of the disease. M. Lobstein, assuming the fact as established, exercises his ingenuity in tracing the connexion of cause and effect; moral emotions produce defective innervation; this, perversion of nutrition, which in its turn causes the formation of carcinoma: the catenation is singularly clear. But though we doubt the lucidness of this explanation, and affirm that mental depression has not been *proved* to exercise the alleged influence, we are far from denying that facts of rather a convincing character in respect of the agency of the mind in the production of this disease are frequently observed. It should, however, be recollected that cancer is a very rare affection before the thirtieth year, and that the number of persons fortunate enough to reach that age without having suffered under disappointed hopes and wasting grief, is, in all probability, comparatively small. Authors who dwell most strongly on this mode of causation of the disease, curiously enough fix on the middle ranks of society as those furnishing the least amount of cancerous disease, yet these are precisely the classes in which reverses of fortune must most frequently occur, and in which the mental anxiety inseparable from professional and commercial pursuits must be strongest and most lasting.

9. *Intellectual labor* has been speculatively set down as a predisposing cause of cancer; but we have been unable to discover any sound motives for the opinion.

10. *Climate*. — On the influence, if any, of climate in the production of this disease we have nothing of a satisfactory kind to offer. Mason Good mentions its being a matter of general agreement that the disease is more frequent and more virulent in the high northern latitudes than in the southern regions of Europe: but the grounds for this uniformity of opinion are not stated. Professor Otto in his recent elaborate essay on the medical topography of Copenhagen¹ makes no mention of the disease.

Out of the population of Paris in 1830, amounting to 770,286 souls, there were 602 deaths (112 males, 490 females) from "scirrhus and cancer;" this gives a mean annual mortality from those affections of .781 per thousand — nearly four times as great as that of London². Of a total number of 30,102 cases admitted into the Hobart-town Hospital during twelve years, there were but four cases of "scirrhus³." In the pages of the Calcutta Medical Journal we occasionally find a passing remark on the infrequency of scirrhus and encephaloid among the Hindoos; but probably these observations are little more than mere matter of surmise.

11. *Hereditary Transmission*. — The question whether the disease is transmissible from parents to their offspring is one which has repeatedly been mooted and decided chiefly on theoretical grounds, or from very limited observation, in the affirmative and negative alternately. Whatever be our general theory of hereditary influence, a satisfactory conclusion regarding its connexion with cancerous disease can only be obtained by the well-advised application of the numerical method. The only absolute demonstration of its reality would be the discovery that of a large

¹ Prov. Med. and Surg. Trans. vol. vii. 1839.

² Journ. Complém. du Dict. des Sc. Méd. t. 41, p. 440.

³ Scott, in Prov. Med. and Surg. Trans. vol. iii. 1835.

mass of cancerous individuals a very considerable majority were born of parents similarly diseased : and that of a like series of subjects unaffected with carcinoma, a small minority, at the most, sprang from a cancerous father or mother. Additional confirmation of the fact would be had, were it proved that the mean period of manifestation of the disease were materially earlier among cancerous individuals born of parents similarly affected, than among persons of untainted parentage. While, however, the existing want of satisfactory proof of the hereditary origin of carcinoma is incontestable, the presumption in favor of such origin is, on the other hand, strong enough to justify the practitioner in acting as if its existence were matter of demonstration, especially as no evil can accrue from his doing so¹. (See the observations on Prophylaxis.)

The occurrence of cancer in the fœtus in utero may be by some regarded as evidence of the hereditary character of the disease : unfortunately authors have left us no account of the state of the mothers' health.

(c.) *Exciting causes*.—These are either mechanical, chemical, or vital.

1. *Mechanical*.—The influence of mechanical violence in the immediate production of cancerous disease is very generally admitted. Indeed, making full allowance for the sources of fallacy already referred to, the number of instances in which the disease appears, as far as it is possible to judge, to have originated some short while after the receipt of local injury, seems to render the occasional reality of such influence hardly controvertible. But numerical results are wanting to show the relative frequency with

¹ For a very remarkable instance of prevalence of the disease among both male and female members of a family, the reader may refer to Warren on Tumors, p. 281 ; the curious will find much speculation on the subject in M. Recamier's second volume.

which this cause operates; in the vast majority of cases in which blows are received, no such disastrous consequence follows, nor has any precise information yet been obtained as to the conditions which cause the same species of injury to produce in one person common inflammation with purulent secretion, in another chronic induration, and in a third lead to the deposition of carcinomatous matter.

Observation disproves, as we have seen, the general importance of local violence in the production of uterine cancer. Evidence of the same kind exists in respect of the brain; of 43 cases of cerebral carcinoma, collected by M. Andral, two only had followed injury to the cranium. Chardel relates the case of a hatter whose trade obliged him to lean forcibly with the epigastrium against a board, and who ultimately died of cancer of the stomach; an event ascribed to the irritative pressure. But he forgets the multitudes of hatters, whose epigastria undergo similar rough treatment, and who notwithstanding descend to the grave with a sound stomach. There is on the other hand an account by Baillie of a case in which a mechanical irritant (five halfpence) had been lodged for a considerable period in the cavity of the stomach, and given rise to the formation of an adventitious cyst, without inducing the least cancerous formation. Of the bearing of these facts we shall presently speak. In connexion with this subject may be noticed a curious crotchet of M. Recamier. This pathologist declares his persuasion that the mere circumstance of a blow being aimed at the stomach may give rise to the disease—that an individual frightened by a gesture imitating a blow, suffered in consequence from “epigastric anxiety,” and consecutively from cancer. In the dark ages of military surgery the wind of cannon-balls worked marvels; but these sink into insignificance in comparison with M. Recamier’s “attempt at a blow.”

2. *Chemical*.—Some years since M. Bouillaud published

a case of scirrhus induration of the pylorus, occurring in an individual who had suffered from gastritis caused by swallowing a quantity of nitric acid. The case is cited in evidence of the inflammatory nature of cancer. But, in the first place, we would ask, where is the proof that the cancerous affection had not existed before the ingestion of the poison? And, admitting the reality of the alleged causation in this instance, that the conclusion *à particulari ad universale* is here singularly illogical is shown by such facts as the following, observed by Laennec, Dupuytren, and Tonnelier. A girl unexpectedly recovered after swallowing a quantity of arsenious acid, but repeating her attempt at self-destruction a year afterwards, succeeded. In addition to the anatomical effects of the poison just taken, a cyst about the size of a goose's egg, evidently separated recently from the pyloric region, was discovered in the interior of the stomach. The contents of this cyst were on analysis by Vauquelin found to be an ounce of crystallized arsenious acid. No appearance of carcinoma was anywhere detected¹.

The action of spirituous liquors indulged in persistently and to excess may be considered somewhat allied to that of irritant poisons; and numerous authors assert that the disease is frequently induced in the stomach by the habit of drunkenness. But no proofs are given of the assertion, and it is contradicted by the fact, that although the stomachs of persons dying with delirium tremens occasionally present the anatomical characters of chronic gastritis, the deposition of carcinoma in that organ has not, so far as we have been enabled to ascertain, been noticed under the circumstances. Besides, how trifling is the proportion of sufferers from gastric cancer to that of habitual drunkards;

¹ Nouv. Journ. de Méd. t. iv. p. 15, An. x.

and how comes it that it is at least as frequent in the sex almost exempt from delirium tremens as among males¹?

3. *Vital*.—Facts of the description now referred to sufficiently disprove the necessary dependence of cancer upon chronic or other inflammation. But irritation is undoubtedly sometimes the immediate cause of hastening the production of the disease in individuals constitutionally prone to it; nay more, we feel disposed to admit—at least well-observed facts seem to point this way—that under certain conditions, at present ill understood, the disease may follow inflammation, where, without the occurrence of this process, the cancerous tendency might always have remained dormant.

(*d.*) *Predisposition*².—Unbiassed experience fully establishes the two following positions:—first, the various presumed causes of cancer may continue in action in many individuals for a length of time with every degree of intensity, and in all possible modes of combination, without producing the slightest manifestation of such disease; secondly, carcinoma exercises its most fearful ravages on subjects who have apparently never been influenced by any of its putative causes. In a word, all sound experience goes to prove that these may occasionally hasten the out-

¹ Of 832 patients affected with delirium tremens and observed by Rayer, Bang, Hoëgh-Guldberg, Krüger-Hansen, and others, 18 only were females. A different statement has been given in this country, but in the form of a simple assertion, respecting the relative frequency of the disease in the sexes. See Brit. & For. Med. Rev. vol. vi. p. 324. 1838.

² The terms *predisposition*, *diathesis*, and *cachexia*, are used in various ways by different writers; in order to obviate misapprehension it may be well to state here the sense in which they are employed in this article. For the meaning of *predisposition* we refer to the text; by *diathesis* we understand the state of constitution in which multiplication of cancers occurs in the economy; by *cachexia*, the sum of general symptoms attending the disease.

burst of the morbid action, or fix it in a particular spot, but never generate it. Hence we are compelled to admit the existence of individual predisposition, as a necessary condition for the production of the disease. The statistical results we have laid before the reader render the necessity of this admission more obvious than it had even previously appeared. In what the predisposition physically consists is a question to which the present state of knowledge does not permit a satisfactory answer. Some authors of repute are disposed to consider it is established by a particular constitution of the blood: the important facts bearing on humoral pathology recently elicited by ingenious experiment and observation give this view a certain degree of plausibility; but for the present it is merely hypothetical¹.

Attempts have been made to show that the predisposition may be limited to a single system; and in proof it is affirmed, that in person thus locally predisposed, an injury which in other parts of the frame would produce no appreciable effect, will, in the weak system, be followed by cancerous formation. An illustration of the opinion (in which we cannot coincide) is found in the conversion of a blistered surface into a cancerous sore in individuals with carcinoma of the skin: but a similar occurrence has been noted, when no cutaneous disease pre-existed.

(E.) DURATION. — The duration of cancerous affections varies from a few weeks to a considerable number of years: may more; tumors, proved to be of this kind by post-mortem examination, and even ulcerated cancers, have been

¹ M. Bouillaud ridicules the idea of predisposition, because its nature is not understood, and because it is only known to exist by its presumed effects. But this is precisely the case with caloric, electricity, &c.; we know nothing of their nature, and recognise them only by their effects: will M. Bouillaud therefore deny the existence of some power or agency, call it what he will, producing the results ascribed to them?

occasionally observed, the existence of which had not apparently shortened the lives of the individuals having them, nor hardly produced more inconvenience than a perpetual issue. The mean duration of the disease, when following the more ordinary course, has never yet been methodically investigated on a large scale.

The extreme scarcity of cases reported with accurate dates will, we trust, be sufficient excuse for the small number of those from which the following results are deduced: they are offered merely as approximations. The length of the disease is of course reckoned from the occurrence of the first symptoms or signs; cases in which it lasted so much as thirty or forty years, in the manner just referred to, are purposely omitted from the calculation: in some of those included in it the patient's existence was evidently cut short by operation — a circumstance to be allowed for in the general result.

	No. of Cases.	Duration in months.
All Species . . .	37	27·14
Scirrhus	18	39·28
Colloid	1	24·00
Encephaloid . . .	18	15·17

The progress of the disease is generally slower in old than in youthful subjects, and it is undoubtedly influenced by locality, though to what precise degree we have not been able to ascertain. Some other observations on this subject will be made hereafter.

(F.) FREQUENCY. — The deaths from cancer in England and Wales during a period of six months amounted to 1228; from this the subjoined results, which we have, for

the sake of comparison, placed beside the quantities representing the frequency of phthisis, may be calculated.

	From Cancer. (two and a half years.)	From Phthisis. (two years.)
Proportion of deaths in every 1000 deaths.	·671	196·563
Proportion of deaths in every 1000 living.	·174	3·963
Absolute number constantly ill, supposing the diseases mortal and of the mean duration above stated.	6,140	111,416

The mortality attributed to cancer in the registers is in all probability below the true mark ; of 163 deaths entered under the head of disease of the genital organs, especially of the womb, a large proportion was in all likelihood caused by carcinoma ; the same is true, though to a less degree, of fatal cases of organic disease of the intestinal canal and of "structure of the rectum and œsophagus" in persons of advanced age.

Whether the frequency of cancerous disease is on the increase is a question of considerable interest, but one to which we cannot unfortunately furnish any very satisfactory reply, as we have not the means of ascertaining the proportion of the population annually cut off by the disease during a series of years. The only statistical facts we can find bearing on this question are given in the following table, showing the ratio of cancerous deaths to the total mortality of the metropolis during the last century.

Time.	Proportion of Deaths from Cancer in every 1000 deaths.
From 1728-57 (30 years)	2.0
" 1771-80 (10 years)	3.4
" 1831-35 (5 years)	4.4 ¹
" June 31, 1837 to Dec. 31, 1838 ² (18 months)	6.1

From this it would, on first view, appear that the frequency of the disease has been steadily increasing during the last 100 years; but the real causes of the augmented ratio are more likely to be the decrease of mortality from epidemic diseases, and the greater accuracy of diagnosis, as respects carcinomatous affections. We must wait for correct answers to questions of this high import, until the present Registration Act has been in operation for a series of years.

The influence of *season* on the mortality of carcinoma is displayed in the following table, drawn up from 285 deaths occurring in the metropolis in 1838.

Quarters ending	Males.	Females.	Totals.
March 30	18	73	91
June 30	8	40	48
Sept. 31	11	64	75
Dec. 31	14	57	71

¹ These three proportional numbers are taken from a table calculated by Mr. Farr, and given at p. 577 of his "Vital Statistics."

² The absolute number of deaths from cancer registered in the metropolis during this period was 470.

Hence inclemency of the weather accelerates the death of individuals laboring under carcinoma, as it does in the case of most chronic diseases. This fact is more clearly seen, when the deaths occurring in the two more genial quarters of the year are compared with those which took place in the more inclement.

	Males.	Females.	Totals.
Temperate half year.	19	104	123
Cold half year.	32	130	162

(g.) SYMPTOMS. — Were it ascertained that the development of cancer is preceded by a certain number of local or general symptoms, an important step would be made towards its early diagnosis, and hence possibly towards diminishing its fatality. Probably, too, such symptoms do arise; at least it is hardly possible to conceive that so important a change as the formation of carcinomatous matter can occur in the organism without being preceded by some species of local or general derangement. However, whether they really do exist, and of what nature they may be, whether of uniform or variable character and occurrence, remains to be decided by future observation; the vague and random statements of authors on the subject are unentitled to confidence.

(a.) *Local.* — As carcinoma is a new formation added to the part in which it is developed, it necessarily follows as a general truth, that increase of bulk is produced by its presence to any considerable amount; in other words, it gives rise to *tumor*. The existence of such tumor is among the most important signs of carcinoma, when coupled with certain properties.

Understood in the widest acceptation of the term, tumor is consequently, from the very nature of the disease, never absent: even in cases of scirrhus of the cervix uteri, where the infiltration of a small quantity of the morbid matter may constitute the whole of the disease, an increase of bulk is produced in the affected part. Again in hollow organs, such as the rectum and œsophagus, where the cancerous matter is commonly infiltrated in the walls of the tube, the term tumor is fairly applicable. The apparent absence of swelling, sometimes met with in mammary carcinoma for instance¹, arises, as we have already explained, from the atrophous condition to which the texture of the organ itself is reduced; diligent examination in such cases rarely fails to detect the morbid substance in the form of a superadded tumor, or of a mass of the organ increased in size from infiltration. The enlargement may be perceptible as soon as formed, but rarely attracts attention until it has acquired the dimensions of a small hazelnut. We remember, however, to have some years since examined a minute globular induration of the size of a pea embedded in the superficial layers of the mamma of a female, which attaining the bulk of a walnut in the course of a year was then removed and found to consist of scirrhus: similar facts are noticed in a subsequent page. The shape of the tumor is subject to much variety; it may be pedunculated or polypiform, wedge-like, circular with flattening, globular, or amorphous, and may or may not be circumscribed. The surface is in the outset usually smooth and even, but very generally becomes lobulated or botryoidal as the growth of the mass advances. We have already spoken of the difference of size under ordinary circumstances of the three species of cancerous tumors. The consistence of scirrhus is usually very considerable; carcinoma

¹ M. Recamier relates a case in which a diseased breast, although containing a growth four inches in diameter, was smaller than its healthy fellow.

of this species, as observed more particularly in the mamma, sometimes possesses the dense, heavy, and unyielding hardness of stony matter. The characters of encephaloid tissue are in this respect peculiar, when it has accumulated extensively, or, in some cases, even from its earliest appearance. Combined with a moderate degree of softness is a sort of doughiness and elasticity; this character coexisting with hardness and density in other parts of the growth will leave no doubt as to the nature of the formation presenting it. It has, however, been mistaken for the fluctuation of an abscess, an error productive of most serious errors in treatment: a bistoury has more than once been plunged under this false impression into the midst of softened encephaloid masses, given rise to tremendous hæmorrhage, led to the immediate establishment of ulceration, and materially shortened the patient's life. Mistakes of this kind, excusable before Hey and Mr. Wardrop had given their graphic descriptions of the disease, and before the nature and diagnosis of "fungi of the dura mater" had been so thoroughly elucidated as they have been by the German surgeons, would at the present day be hardly venial. The sensation felt on pressing the softer parts resembles very strongly that produced by an erectile tumor. Dupuytren states that pressure gives rise in some portions of the growth to a sound like that of crumpling parchment. Scirrhus, when softened partially, becomes the seat of pseudo-fluctuation, which is, however, very different from the elastic feel of encephaloid; and a knot of varicose veins lying on the surface of a tumor may, as M. Recamier remarks, be mistaken by an inattentive person for the phenomenon under consideration.

The vascular character of encephaloid seems to render it an *à priori* probability that under favorable circumstances pulsation might be detected in it. The existence of pulsation is in fact one of the signs of meningeal encephaloid growths protruding through the cranium; but observers are not

agreed as to whether this is a motion transmitted from the subjacent brain, or arising in the substance of the tumor itself. The same indecision exists with respect to the beating noticed by Dr. W. Stokes¹ in a case of intra-thoracic carcinoma. On the other hand Dupuytren makes no question of the occurrence of interstitial pulsation; and describes the phenomenon as at first deep-seated, becoming gradually more superficial and distinct, isochronous with the pulse, unattended with rustling sound (*bruissement*) accompanied sometimes in advanced cases with general expansion of the mass, ceasing when the chief artery leading to the part is compressed, and produced by simultaneous dilatation of all the minute arteries of the tumor.

Scirrhus formations are not in their early stage endowed with any marked *sensibility*; as a general rule it may, indeed, be affirmed that they are then insensible, pressure and various manipulations exciting no discomfort. It has, however, been remarked by numerous observers that pain is very commonly experienced about half an hour after these tumors have been examined, especially if they have been at all roughly handled. When pain is excited immediately after or during pressure, this may, according to some writers, be taken as evidence that inflammatory action is going forward: if this statement be understood to apply to the tissue surrounding the cancerous substance, it is very probably correct. Subcutaneous encephaloid growths are more liable to be painful under pressure: colloid, it is said, less so than these.

The *shape of organs and parts* in which cancer is developed is greatly altered in some cases. The accumulation of the foreign matter in the liver occasionally enlarges that organ prodigiously, and modifies its figure. Cancerous deposition in the bones is sometimes attended with an ex-

¹ On Dis. of the Chest, p. 379.

traordinary expansion of their substance. But the most important alteration of shape in a practical point of view exhibits itself in hollow organs or canals. The accumulation of cancerous matter in the walls of these parts has the effect of diminishing their caliber, whence arise the most distressing symptoms of the disease in such situations. Thus in cancer of the rectum, œsophagus, and larynx, obstructed movement of the matters naturally circulating through those ducts—of the fæces, ingesta, and air—is an early consequence of their decreasing diameter. Further, in the effort to remove the accumulation of the contents of the part which occurs above the obstruction, the muscular coat of the diseased tube becomes hypertrophous, while dilatation proportional to the quantity of the stagnating matters is likewise produced.

Among the symptoms properly so called, *pain* claims our first attention. We have here to repeat the observation made respecting the tenderness of these growths under pressure—pain rarely exists in the incipient stages. The time of its first appearance is not regulated by any fixed rule, nor is it by any means exceedingly uncommon, embracing in this proposition all species of cancer and all organs and parts internal as well as external, for the disease to originate, advance, and terminate by the death of the patient without giving rise to appreciable pain. This is an important point, for we have known the carcinomatous nature of tumors resolutely contested on the score of their being unattended with local suffering—tumors of which the ulterior progress placed their cancerous nature beyond all doubt. In other cases pain appears to exist from the earliest period of the disease; a third class of subjects tortured with it in the outset of the complaint are released therefrom towards the close.

The character of the pain in external cancer, more especially in scirrhus of the breast, which has commonly

served as a type for all general descriptions of the disease, is usually lancinating. It is compared by the sufferer to the prodding of knives, incision with lancets, &c.¹ But like the existence of pain, the constancy of this particular character has been much exaggerated; in a multitude of instances, even in the mamma, the pain never assumes this form; in others it does so only temporarily, and in certain organs lancinating pain has rarely, if ever, been observed. Besides, growths of innocent nature are sometimes accompanied in the most distinct and well defined manner with suffering of this kind. How common is it nevertheless to hear the "benignant" or "malignant" character of a tumor confidently predicated from the absence or presence of this most equivocal sign. In some instances the pain is of a burning kind, and this may alternate with the former description; in others a dull aching sensation is all that is experienced; some patients complain of distressing pruritus; a feeling of weight and coldness in the part constitutes the sole local discomfort of others.

Of whatever kind the local suffering is, it is rarely continuous. It is said to be most severely felt at night, wherein it shares a property of almost every description of pain. Jäger affirms that it is increased by dampness of the weather, and by an electric state of the atmosphere. The species of cancer modifies its constancy and severity: colloid is productive of comparatively little suffering; encephaloid probably of less than scirrhus.

Mr. Travers conceives the pain to be produced by "inflammatory action" and "ulceration;" Bégin that the commencement of softening and the invasion of pain are coeval: the general truth of both propositions (which possibly mean the same thing) may be questioned in respect of

¹ *Eclairs de douleur* was the forcible expression once used by a patient in describing her feelings to Dupuytren; a northern Professor likens these rapid pangs to "gleams of the Aurora Borealis."

external carcinoma; and they are decidedly erroneous if applied to that of internal organs. It may be affirmed that the intensity and constancy of the pain usually give a fair measure of the degree of rapidity with which the disease advances. M. Recamier, however, states that he has known extremely painful cancer last 18 years, while in other cases the affection, though unattended with notable suffering, terminated fatally in a very few months; in the former instances there was no fever, in the latter occasionally febrile paroxysms.

Hæmorrhage, which does not ordinarily occur before ulceration has set in, is sometimes one of the earliest effects of the disease. Thus the discharge of a few drops of blood from the nipple in scirrhus of the breast, a tolerably frequent occurrence, has in some rare instances been the first morbid phenomenon observed. Profuse menorrhagia in not a few cases precedes all other symptoms of uterine cancer; and in a case of pharyngeal carcinoma which we observed some years past, the patient persisted in affirming that severe hæmorrhage from the throat was the first circumstance that drew his attention to the part. In a similar manner hæmoptysis is frequently the first occurrence announcing tuberculous disorganization of the lungs. But we would not be understood to mean that effusion of blood is really the very first abnormal effect of the heterologous formation; others have probably led the way, but from their trivial character escaped the attention of individuals who are not in the habit of carefully watching the variations of their health: admitting this to be the fact, the practical value of hæmorrhage as a symptom is by no means lessened.

Derangements of function form an important item in the symptomatology of carcinoma, and of course vary with the organ in which, or in the immediate vicinity of which, the morbid matter is developed. - They may be

included under the heads of irritative and mechanical. As illustrations of the former we may adduce the vaginal discharge produced by non-ulcerated scirrhus of the uterus; the occurrence of hydrothorax and pleuritis in subjects affected with mammary cancer. In exemplification of the latter may be mentioned the occurrence of amaurosis from pressure on the optic nerve; the interruption to vision occasioned by tumors driving the eye from its normal site; obstinate constipation from pressure of enlarged pelvic glands; derangement of local circulation and serous accumulation either in the shut cavities or in the cellular membrane, produced by partial closure of adjacent circulating tubes, arterial, venous, or lymphatic.

Such are the more prominent symptoms of growths which have not undergone ulceration. This process is preceded by changes in their own anatomical state, in their degree of connexion with surrounding parts, and in the appearance of the investing skin. These have already been sufficiently described, as well as the characters of the ulcer; the fact of a sanies of fetid odor and peculiarly acrid qualities being more or less abundantly thrown out by the disorganized surface has also been dwelt upon at length. The contact of this matter with the cutaneous surface may produce irritation, erythema, and even corrosive ulceration of the parts surrounding the ulcer.

The pain usually increases considerably in violence at this stage of the disease; its character is subject however to vary, as in the earlier periods. The ulcerated surface is frequently quite indolent to the touch. Hæmorrhage now becomes of more constant occurrence, originating in the manner already explained.

(b.) *General.*—While the local changes advance in the diseased formation, the constitution almost invariably suffers in a marked and peculiar manner. Heterologous growths possess the property of disturbing, each after its

special mode, the phenomena of circulation, nutrition, and innervation, and of producing thereby a depraved condition of the organism, designated by the general term *cachexia*. The group of symptoms constituting the cancerous variety of this condition, when combined in their most marked and characteristic form, may be stated as follows: it is not intended in this enumeration to display the order of their occurrence; as this varies, we may almost say, infinitely, we have thought it better to group them according to the functional system affected.

The circulation is hurried, there are occasional fits of shivering, alternating with heat of surface, perspiration or sweatings, especially by night; the pulse, unless when the patient has been debilitated by the frequent recurrence of hæmorrhage, has a wiry somewhat resisting character; the fever gradually assumes the hectic type; the night is passed in a state of distressing watchfulness, or total insomnia; the solid portion of the blood gradually loses its healthy proportion, and passive serous effusions into the pleuræ, peritoneum, or general cellular membrane follow¹: in cases attended with repeated and severe hæmorrhage the arteries become the seat of some modification of the *bruits de soufflet* or *de diable*, as we have had occasion more especially to observe in uterine cancer.

The patient loses his appetite, takes a complete disgust for food of every kind; the small quantity he swallows is imperfectly digested, nausea or actual vomiting frequently

¹ As regards the condition of the kidneys and urine in cases of such effusion, the investigations of M. Rayer show that there is frequently neither co-existing renal lesion nor albuminuria; he alludes to two cases wherein chronic albuminous nephritis (Bright's disease) "occurred in the course of cancerous disease of the stomach" (*Maladies des Reins*, t. ii. p. 343, 1840), but there is no evidence given to prove that the former was an effect of the latter. M. Martin Solon (*De l'Albuminurie*, p. 163, 1838) relates a doubtful case of the same kind.

occurs; there is persistent thirst and constipation, alternating with colliquative diarrhæa; towards the close an aphthous eruption occasionally appears in the mouth, as is observed in other lingering chronic diseases attended with marked debility.

The nutritive functions become impaired, the tissues grow soft and flaccid, the patient loses flesh, the fatty tissues are completely absorbed, the very skin seems to undergo attenuation, the emaciation proceeding to perfect marasmus, unless when œdema of the cellular membrane interferes with its visible progress. The skin, and even the mucous membranes, assume a peculiar straw-colored and waxy appearance, accompanied with a semi-transparent puffiness—one of the most characteristic marks of this form of cachexia, though not actually peculiar to it.

Debility and exhaustion become extreme, and occasionally make such rapid progress as of themselves to threaten the existence of the patient. The countenance maintains an habitual expression of care and suffering, the features are contracted, the temper morose, and the sufferer at length sinks—this is said to be most frequent in cases of cancer of the stomach—into a state of actual despair.

The quantity of circulating fluids gradually decreases, and the patient, unless cut off by some intercurrent malady, worn out with pain, debility, and fever, dies in a state resembling a prolonged fainting fit. Death is also frequently the result of some local irritation; in old subjects of latent pneumonia. In other cases, as when the alimentary canal is obstructed, the fatal termination is the direct effect of inanition; and certain peculiar modes of death will be alluded to hereafter. The intellectual faculties lose their clearness towards the close, but there is no actual cerebral affection, unless when the contents of the cranium become the seat of the morbid deposition.

To this catalogue of evils may be added, as of not very

uncommon occurrence, a morbid change of the bones, exhibiting itself in some one of the following forms: 1. atrophy of the spongy and compact structures from defective nutrition; 2. excess of inorganic matter in their composition; 3. defective supply of saline materials, in consequence of which, the bony tissue appears as if it had been macerated in a mineral acid (carnification); 4. carcinoma of their substance. The first of these forms is singularly rare: Recamier, however, appears to have met with an example of it: of the third we have not met with an authentic instance, and insert it rather hesitatingly. In the first three cases, the morbid state is a manifestation of the *cachexia*; in the fourth, an evidence of the *diathesis* having reached the bones. In the first, second, and fourth cases, especially the last, fractures occur with extraordinary facility. In cases of cancerous deposition in the bones, the fracture may either arise from complete transformation of a portion of the cylinder into cancerous matter, or from the pressure of a central growth, causing the absorption of the compact tissue. (See Fig. II.) When the fracture is of the former description, crepitation will either be wholly absent or ill marked; in the latter case this sign is producible in the ordinary way. When a cancerous patient suffers persistently, or pretty constantly, from pain in a particular spot in the course of a bone, the occurrence of such fracture is to be apprehended; but such local pain is not a constant forerunner of the accident, nor necessarily followed by it. The pain has been mistaken by patients for rheumatism; and this error has not unfrequently been shared by the medical attendant¹. In not a few cases the occurrence of fracture has manifestly hastened the fatal issue of the disease.

¹ Salter, in Med. Chir. Trans. vol. xv. p. 186. S. Cooper, in idem, vol. xvii. p. 51.

Certain writers have described loss of the faculty of smell, imperfect vision, and other morbid conditions of the senses, as characteristic of this form of cachexia: more correct observation has disproved their assertions.

In the preceding sketch we have endeavored to describe the most common type of cancerous cachexia; but perfect uniformity is not to be looked for here more than in any other combination of pathological actions. Thus, fever may be altogether wanting, or instead of wearing the hectic character, manifest itself simply in acceleration of the pulse and heat of skin after paroxysms of pain of more than ordinary severity. In rare instances, the frequency of the pulse diminishes with the advancement of the disease. A symptom which, in some subjects, acquires such intensity as to divert their attention from the local affection altogether, is pain, either of a fixed or erratic kind, in one or more distant parts of the frame: this usually exists in the course of the more important nerves of the extremities. M. Andral remarks, that in cases of cancer in the brain, the trunk and extremities sometimes become the seat of sensations, simulating nervous or rheumatic pains; in other instances the skin is exceedingly sensitive, in others deprived of all sensibility. The occurrence of similar suffering, in subjects dying from mammary or uterine cancer, may have sometimes depended on implication of the brain in the disease. Again, emaciation is not of constant occurrence; and even the peculiar straw-colored tinge of the skin may not exist. The appetite too may be preserved. But enough of these exceptional conditions, numerous other varieties of which may be found noted in published cases.

It may in general terms be stated that the cachectic symptoms do not make their appearance until an advanced stage of the disease; so general was the belief at one period in the uniform truth of this position, that the prognosis and treatment were in a great measure guided by the

absence or presence and degree of intensity of the cachexia. Here was, however, a grave practical error; for as the experience of accurate observers has proved; 1. cancerous growths may, in their earliest stage, even before induration of the lymphatic glands has taken place, produce such general functional derangement as is indicative of the most severe form of cachexia¹; 2. cases in which the whole anterior surface of one side of the chest, or the vagina and the major portion of the uterus were destroyed by cancerous ulcerations, have been known to be accompanied with comparatively slight general disturbance (Breschet); 3. patients have occasionally to the last preserved their appetite and flesh, and been able to attend with more or less closeness to their ordinary business (Bayle); in other words, the disease has terminated fatally without the establishment of cachectic symptoms.

If we consult the works of writers who have touched upon the question, we shall find that they, almost without exception, no matter to what school they belong, regard a modified state of the blood as the cause of the cachectic symptoms. While some, however, advance the opinion as an hypothesis based on many probabilities, others announce it as an ascertained fact: among the latter is M. Cruveilhier. This pathologist, considering the cancerous cachexia and diathesis as one and the same thing, explains the occurrence of both on the principle of venous transmission: hence the existence of either involves that of the other².

¹ This fact shows the fallacy of an hypothesis of Velpeau, that the cachexia only occurs in cases of softening of internal or ulceration of external carcinoma.

² M. Cruveilhier in one part of his work (Livrais. xxv. Rectum, p. 3.) states his belief that the cancerous cachexia depends less on the disease itself than on the hæmorrhages with which it is accompanied; — a curious notion from a pathologist professing the general doctrine of the disease, explained in a previous page, for it is almost

In this confusion of diathesis and cachexia the Parisian pathologist is joined by Müller. Yet that the distinction between the two is not a scholastic refinement, but actually exists in nature, is rendered clear even by the examination of the present question. In fact, no regular relation subsists between the intensity of the cachexia and the number of organs secondarily affected; cancer of the uterus, which habitually gives rise to most intense general reaction, rarely induces, as has been stated, extensive secondary formation; nor is it exceedingly uncommon to find numerous organs affected in subjects who have suffered to a slight amount only from cachectic symptoms. The necessary inference from these facts seems to be that the diathesis and the cachexia are produced in different modes; and as we have seen that strong probabilities argue in favor of the production of the former by cancerous impregnation of the venous blood, we cannot do otherwise than reject the agency of this in respect of the cachexia. Yet it must be confessed, that until an extended investigation into the condition of the blood at all periods and under all circumstances of the disease shall have been undertaken, these questions are destined to remain undecided.

This class of symptoms appears often to be modified by the species of cancer. According to Laennec fever is absent during the greater part of the course of encephaloid, and in many cases death occurs without any perceptible acceleration of the pulse having ever been noticed. When fever does exist, it appears rather to depend on accidental circumstances than on the mere presence of the morbid tissue. Emaciation does not ordinarily come on till the disease has existed for a considerable time, but once set in,

tantamount to saying that an effect is increased by the removal of its cause. Independently of this, however, it is incorrect, for the cachexia sometimes exists where hæmorrhage has never occurred.

rapidly advances to marasmus. Velpeau's case, already frequently adverted to, proves that the disease may occupy a vast number of organs and exist for a number of years (six at least) without producing notable loss of flesh or discoloration of the skin. In other instances, on the contrary, a limited accumulation in a single organ excites the most formidable train of general symptoms. Colloid, as Cruveilhier states, is the species of cancer accompanied with the least marked and most tardily developed signs of constitutional suffering; and in the majority of cases of cancer of the stomach without local symptoms observed by him, the disease was of this kind. Pockels met with a case of gastric colloid in which none of the usual evidences of cancerous disorganization existed, except the straw-colored tint of the skin. (Müller.) In respect of the influence of organs on the cachexia, the mamma, uterus, and stomach are unquestionably the most commonly attended with its intensest forms. Andral affirms¹ "that cancer of the stomach produces the greatest degree of emaciation; that females, whose cervix uteri has been totally destroyed by cancer, retain their natural looks to the last:" the latter clause of this statement assuredly refers to exceptional cases.

(H.) DIAGNOSIS. — The diagnosis of cancerous growths of external parts previously to the occurrence of ulceration, sometimes presents considerable difficulty. They may by possibility be confounded with all tumors which produce no change in the color of the skin or temperature of the surface, and in which distinct fluctuation of a liquid is not perceptible. (Bégin.) The subject of diagnosis will, however, be considered under the head of each organ, and it is therefore unnecessary to multiply general remarks in this part of our article. The characters of the ulcer which we

¹ Additions à l'Auscult. Médiate, p. 260. Par. 1836.

have described at length, its everted and ragged edges, its indurated base, the peculiar fetor of the discharge, the tendency to fungating growth, the frequent occurrence of hæmorrhage, form a group of phenomena which combined can scarcely mislead. But in secondary syphilitic cases the most experienced surgeon sometimes feels doubt as to the nature of the affection, a doubt which is not in all cases cleared up by the history of the patient's previous life. Even simple ulcerations of the tongue from the irritation of a carious tooth will occasionally closely resemble cancerous destruction, and be hardly distinguishable therefrom until the removal of the irritating body, followed by rapid cicatrization, proves the innocent nature of the sore.

(1.) PROGNOSIS. — As regards the ultimate termination of the disease, the question of prognosis is involved in that of curability, which will be presently considered. With respect to its mean duration, our application in particular cases of the general result already given must be materially modified by the species of cancer, the organ affected, the stage of the local process, the activity of the growth, the amount and constancy of pain endured, and above all perhaps by the condition of the general health, the degree to which the nutritive and other functions are affected by the presence of the morbid mass. As a general truth, cancerous tumors which have apparently commenced to form subsequently to the receipt of a local injury are more susceptible of being delayed in their progress by treatment, than those in the evolution of which no such influence is traceable.

§ 4. — *Therapeia.*

Before entering on the subject of treatment, it seems natural to say a few words on a point which has been

the theme of warm controversy—the curability of the disease.

A disease is capable of cure either by a natural process or by art. The former may be generally referred to the heads of resolution, and of altered nutrition; the one exemplified in the disappearance of inflammatory changes, the other in the conversion of tuberculous matter into an innocuous, cretaceous, or calcareous concretion. Now one of the most essential attributes of cancerous substance is an unswerving tendency to grow; its nature is opposed to resolution. Yet there would be temerity in denying the possibility of the latter occurrence. Mr. Travers relates that “the solution of chloride of lime effected the absorption of a large tumor (in the course of some months) regarded by competent authorities as scirrhus, in a lady whose other breast had been extirpated for that disease. Not long after she died of asthma from diseased lungs; the scirrhus tubercle appearing not only in the chest but in several of the abdominal viscera.” We cannot regard the connexion of this resolution and the use of the chloride otherwise than as a mere coincidence: perhaps, as in Recamier’s case, there was here only metastasis and not disappearance of the morbid matter. Researches in comparative pathology appear to have shown that cancerous masses may become the seat of an altered form of nutrition leading to a change in their composition tantamount to a cure. M. Trousseau has frequently traced the conversion of scirrhus into ossiform matter in the lower animals; and in the horse, dog, and cat, satisfied himself of the transmutation of encephaloid and scirrhus into encysted masses containing a homogeneous matter finely granular, varying in color from a straw-colored yellow to a rusty red, without vessels, cellular filaments, or the least vital connexion with the inner surface of the cyst. The separation of the “dead matter” from the tissues of the body by a lining cyst pro-

teets the latter from the irritative effects which the former might produce. We have already given our reasons for dissenting from the statement of authors respecting the bony transformation in the human subject: the second kind of change is not alleged to have been observed in man; there is, nevertheless, no *à priori* reason why it should not occur.

In some rare instances spontaneous gangrene of the surrounding parts has led to the separation and expulsion of cancerous growths and been followed by complete recovery¹. Cline², Everard Home, Steidele, and others, have observed this fortunate accident. Dupuytren considered it most likely to occur in cases of encysted cancer: we are unaware whether this notion is confirmed by general experience. The separation of cancer in this way is not however certainly followed by recovery: Cruveilhier alludes to a case in which healthy cicatrization set in after the fall of the growth, yet indurated masses soon made their appearance in the cicatrix, and though these were destroyed with the chloride of zinc, the disease spread to the axilla.

[Dr. C. T. Jackson has lately communicated to me the following interesting fact, relating to this subject. He was called on to amputate the breast of a lady between 70 and 80 years of age. The tumor dated from 40 years before. It was of almost a stony hardness, very movable, and apparently of the encysted character. It was unattended with any great pain or discomfort to the patient. Dr. Jackson seeing no immediate necessity for an operation, and considering the age of the patient, advised delay. Some short time after,

¹ Garnéri, Bull. de la Soc. Méd. d'Emulat. Déc. 1810. Sept. 1811. Dupuytren. Journ. Hebdom. t. iv. p. 38, 1829. Richerand. Nosogr. Chirurg. t. i. p. 381. Ed. 2.

² Lancet, vol. ii. p. 401.

the tumor began to ulcerate, and finally sloughed away piecemeal, until the whole tumor was discharged. The wound cicatrized kindly, leaving the patient in the enjoyment of perfect health. — W.]

It is also affirmed that the cicatrization of true cancerous ulcers has occasionally proceeded to completion, and a permanent cure resulted. Of this extraordinary occurrence an example is related by Nicod¹; Bayle declares that he has seen several such cases. Such are the more important facts bearing on the spontaneous cure of cancer.

Upon the incurability of the disease by merely medicinal means almost all writers are agreed; but in respect of the possibility of eradicating it from the system by operation there is no such unanimity. While some maintain that successful extirpation has seldom or never been witnessed: others proclaim their successes as almost equal in number to their operations. The elder Munro states, that of sixty persons operated on for cancer four only remained free from relapse at the end of two years; Scarpa in the course of a long practice observed only three cases of extirpation of true scirrhus permanently successful; Boyer maintained that of 100 patients operated on 95 or 96 succumb under a return of the disease. These calculations, as M. Littré remarks, refer chiefly to cancer of the breast and testicle, and would be of a more favorable kind if extended to cancers of all parts and developed at all ages. True cancer has been radically cured after a second, nay even a third operation. Lacombe² relates with full detail the history of a woman aged 49, who had been operated on four times for cancer of the mamma, and had, at the time the work was published, enjoyed perfect health for five years. In the year 1770 the general result of operations performed by

¹ Bull. cit. No. 1. 1810.

² Propositions sur le Cancer, 1805.

Mr. Hill of Chester stood thus : of 88 cancers, extirpated at least two years before—not cured, two; broke out afresh, nine; threatened with a relapse, one; in all twelve, which is less than a seventh part of the whole number. At that time there were about forty patients alive and sound, whose cancers had been extirpated above two years before.” Reviewing the clashing results of Munro and Hill, Richter exclaims, “ Jure sane dixeris de uno eodemque morbo hos viros loqui, dubitari fere potest.” The experience of the best surgeons permits us to go further than this, and affirm as an indubitable fact that they did not write of the same disease—that many of Hill’s cases must have been examples of simple mammary hypertrophy, of fibrous tumors, and other non-carcinomatous conditions. In the quaint language of Dionis — “ Pour chanter victoire il ne faut pas avoir pris une glande engorgée pour un cancer caractérisé, comme font quelquefois ceux qui se vantent d’en avoir guéri des milliers¹.” Even local relapse is no absolute proof of the cancerous nature of an extirpated tumor; reproduction of other structures is not very unfrequently entailed by a portion of the mass being left behind. But if there be delusion in the extravagant estimates of Hill and one or two other such exceptional operators, there is still more serious error in the dictum of those surgeons who, like Boyer, having witnessed a considerable number of unsuccessful operations, generalize these results and shut their eyes to every fact of opposite tendency. Obligated to admit that affections declared cancerous before operation have been cured thereby, they reject the evidence of such cases on the plea that the complaint could not have been cancerous, *because it was cured*: in other words, they beg the question at issue.

We would warn the student against the notions promul-

¹ Cours d'Opérations, p. 640.

gated by some writers on this subject originating in *à priori* theories on the nature of the disease: against the doctrine of M. Bouillaud, for example, who sees no difficulty in the way of curing cancer, because cancer is merely an inflammatory induration: against that of M. Breschet, who, guided by the speculations of Bichat, traces the disease to an aberration of "organic sensibility," and is persuaded we may readily manage this peccant entity.

The following propositions appear to embrace such facts as are established respecting the curability of carcinoma by art. 1. There is no existing evidence to show that carcinoma of an internal organ has ever been cured. 2. Cancer has never been removed by medicinal agents alone. 3. Morbid productions possessing the anatomical and pathological character of scirrhus have been removed with the knife, and no return of the disease been observed for a number of years, and occasionally during the entire course of a life prolonged beyond the expectation of life in healthy individuals at the period of removal. 4. Although it cannot be doubted that many of the tumors referred to by M. Recamier were not really composed of that tissue, yet it seems impossible to affirm this of all of them: it would follow then that carcinoma has in rare instances been cured by compression, aided by other external and internal remedies. 5. The probabilities of effecting a cure vary with the species of cancer. There are few authentic instances on record of permanent recovery after the ablation of encephaloid¹; successful removal of scirrhus is of more frequent

¹ M. Travers has never known a patient survive longer than four years after the removal of encephaloid. Scarpa lays it down as a law that ablation of this growth invariably hastens death. We shall have occasion to refer to cases distinctly disproving the general truth of the Italian's doctrine; and Gräfe "has *often* extirpated fungus hæmatodes without any relapse having occurred for 16, 18, or 20 years." *Gaz. Méd. de Paris*, p. 170. Mars, 1835.

occurrence, and the tendency of colloid to reproduction, although Velpeau states it to be extreme, is probably lower than of the other varieties. 6. The earlier the morbid mass is removed the stronger are the chances of ultimate recovery: Scarpa's three successful operations were performed within the first three months; of twenty-seven schirri removed by Flajani within the first month of their formation two only returned¹. 7. Encysted cancer, provided the cyst be removed, is less liable to return than non-encysted. 8. The chances of success diminish out of all proportion with each repetition of the operation. 9. It has been stated that the removal of cancer in some parts is more prone to be attended with relapse than in others: mammary cancer is instanced as an example of the former, osseous of the latter. We are disposed to acquiesce in this notion, but it requires to be proved numerically; and the fact that under the term osteo-sarcoma have been included growths in bone of almost every description, fibrous, cartilaginous, &c., as well as the truly cancerous, renders it exceedingly probable, if not certain, that the supposed immunity of bone in this respect, has been exaggerated. 10. It is indubitable that local, and probably distant, reproduction frequently depends on some of the diseased growth being left behind: some microscopical observations illustrating this point may be seen in Part II. under the head of cancer of the skin. The inference is, that were ablation perfect, recoveries would be more common.

It would in theory appear that the removal of a tumor cannot in itself cure the disease, as the local formation is but a symptom of a general vice of the economy; but this only proves that the local removal acts, however inexplicable this may be, as a sort of alterative on the constitution,

¹ But were these all examples of true scirrhus? Vid. Collezione di Osserv. e Riflessioni, t. i. p. 277.

or that a change co-arises spontaneously in the general state of the system. This may be rendered clearer by an illustration. Phthisis, a disease of which the constitutional nature is not disputed, is well ascertained to have disappeared symptomatically after the expulsion of tuberculous matter, and contraction of cavities, or after the conversion of that matter into inorganic salts. Again, all surgeons are acquainted with the regeneration, as it were, of the individual, which sometimes follows the removal of a joint affected with the same tuberculous or scrofulous disease.

Prophylaxis. — The idea of a prophylactic treatment involves the possibility of recognising the tendency to the disease before the actual formation of carcinomatous matter. In the present state of the science this, as has been stated already, cannot be done; nevertheless M. Littré considers it possible that in some cases, when a suspicious state of health exists in persons springing from a cancerous father or mother, the development of the disease might be warded off by a change of climate, of habit, of diet, by the use of mineral waters, &c. The same precautions might advantageously be enforced in the case of the immediate relatives of persons decidedly cancerous. And, further, as certain morbid formations are prone to become cancerous from the development of scirrhus, encephaloid, or colloid in their substance, the removal of the former may be looked on as prophylactic against the latter.

Internal remedies. — Among substances presumed to act on the disease by altering the condition of the blood, *conium* has obtained vast celebrity. Originally recommended by Störck in 1761 as an infallible remedy, it is still confided in by some practitioners. Störck employed the extract, and commencing by grain doses increased the quantity to two drachms daily — in fact, until it produced a slight degree of toxic effect. The extraordinary exaggeration of Störck was soon made notorious by the inquiries of

various experimentalists throughout Europe ; yet M. Recamier has of late years affirmed that several cases of internal and external cancer have yielded in his hands under the use of this drug. He limits the patient at the same time to one-third of the ordinary quantity of food, and directs the use of the decoction of sarsaparilla after each dose of the medicine and as a substitute for water at meals. M. Recamier administers the extract, and ascribes his success in some measure to the following mode of preparing it : the plant is exposed to the vapors of vinegar or alcohol before expression ; and the juice heated in a sand bath and evaporated to the ordinary consistence. Dr. Copland has prescribed the inspissated juice and powdered leaves in cases of internal scirrhus in combination with the alkalies and tonics, and has always found them much more beneficial when thus associated ; the amount of benefit is not, however, stated. The conclusion drawn by Bayle from an impartial review of the statements of others and from his own experience is, that conium never cures cancerous disease, but occasionally retards its progress and alleviates pain. The general sense of the profession at the present day, spite of M. Recamier's pleadings, is decidedly in favor of M. Bayle's conclusion. M.M. Marjolin and Pauly are of opinion that its only action consists in destroying the digestive powers and producing headache.

Aconitum, belladonna, hyoscyamus, laurus cerasus, stramonium possess similar claims to notice, but in a less degree.

Since its first recommendation in the tenth or eleventh century by a monk named Theodoric, *arsenious acid* has been extensively prescribed for carcinoma ; opinions as to its efficacy are divided. On the one hand appear the assertions of an experienced Swedish practitioner, Roennow, who after fifty years' employment of it had succeeded in curing thirty cases of well-marked cancer : on the other,

experiments on an extensive scale, conducted in Germany, France, and in this country, teach us to question its power in curing any form of the disease. Mr. Hill, however, states as the result of his experience, that this substance retards the progress of the complaint, and often prevents scirrhus from passing into the ulcerative stage¹. Dr. Copland believes that when this medicine is cautiously employed, both internally and externally, in conjunction with narcotics and alkalies, or otherwise judiciously combined, Mr. Hill's opinion in its favor is not much too highly colored.

Considerable hopes were excited some years since regarding the efficacy of *iodine*; but the fallacy of these hopes is now matter of notoriety. Dr. Copland, however, still recommends iodine in small and repeated doses with potassa and conium or opium. He states that in two cases of "reputed scirrhus" which had withstood other means of cure for a long time, perfect recovery was obtained through a course of the hydriodate of potass: the statement is, however, qualified by an admission which is exceedingly likely to be well founded, that they were not examples of true carcinoma.

The *iodurets of iron and of arsenic*, but more especially the latter salt, have been forcibly eulogized by Dr. A. T. Thompson. The evidence in their favor is such as is supplied by the following case. "A lady, ætat. 46, had a tumor in each breast, accompanied with occasional severe darting pains; on one side the tumor was movable, on the other fixed; the arms had become œdematous, the complexion was sallow and anxious, there was constant fever and the health was rapidly sinking. . . . Ten or twelve leeches were applied at short intervals with poultices composed of poppy heads, digitalis and conium, and the ioduret

¹ Ed. Med. Surg. Journ. vol. vi. p. 58.

of arsenic administered in one-eighth of a grain doses, with extract of conium every eight hours; the dose of extract was gradually augmented from nine to sixty grains in the day. Three grains of iodide of iron in solution were taken between each dose of the pills; the patient was strictly confined to a milk diet. This plan of treatment was pursued for upwards of eleven months, during which time the iodide of arsenic was carried up to doses of one-third of a grain . . . the tumors gradually became softer and disappeared, the pains ceased, and the general health improved in a striking manner, until the patient was completely freed from disease¹." The number of times leeches were applied is not stated, and the treatment was altogether of too composite a character to allow of our forming a precise estimate of the value of the iodide of arsenic. We should, nevertheless, be strongly disposed to give this salt a trial under favorable circumstances.

Preparations of *iron*, originally recommended by Justamond and De Marre, have of late years been reintroduced to the notice of the profession by Mr. Carmichael. This eminent practitioner prefers the subphosphate, but also exhibits the phosphate and bi-phosphate, carbonate, and tartrate internally. The external use of these salts is combined with the internal; if the disease be in the ulcerated stage they are applied in the form of a paste made with water; if not, a lotion, consisting of a strong solution of some one of them, is kept constantly applied to the part. The ammoniuret of iron received the especial recommendation of Denman².

With respect to the use of *mercurial preparations*, Mr. Burns remarks that no fact is more clearly ascertained than that mercury always exasperates the disease, especially after

¹ Lancet, Oct. 27, 1838, and *Crane*, Lancet, Aug. 31, 1839.

² Observations on the cure of Cancer, p. 77.

ulceration. Of the truth of this statement, if applied to large doses of the mineral, especially when exhibited with a view to affecting the gums, no doubt can be entertained. Sir A. Cooper, however, employs it as an alterative in the form of Plummer's pills. Strange to say, in France, where calomel is so sparingly employed, the exhibition of this salt in combination with conium has been strongly recommended by M.M. Gama and Bégin. These practitioners commencing by very minute doses gradually increase the quantity until salivation, or a state of continued purgation is established. There are few medicines, according to M. Bégin, which more frequently realize the hopes of the practitioner. General and local antiphlogistic treatment with emollient or narcotic local applications, and, if practicable, compression, are enforced at the same time.

Animal charcoal in doses of half a grain, by degrees increased to four grains, twice daily, has been spoken highly of by Weise¹. His favorable announcements have not been confirmed.

Electricity and galvanism have been tried in consequence of an account published by Dr. Easton respecting a lady who having been struck with lightning found herself gradually freed from a scirrhus tumor which had resisted a variety of modes of treatment. Experiments were made with these agents by Brisbane and Walther among others, but not with results justifying any confidence in their efficacy.

External remedies.—The idea of diminishing the size of cancerous growths by repeated leeching is of very early date. Valsalva energetically lauded this method of treatment, and Fearon, persuaded of the inflammatory nature of the disease, trusted to it almost wholly; venesection

¹ Ueber die Zurückbildung der Scirrhen und Polypen : Leipzig ; 1829.

being substituted when an internal organ suffered. Modern experience has established the degree of utility of local abstraction of blood. In the earliest stages of diseased induration the application of leeches is strongly advisable; even as a guide to the diagnosis of tumors of doubtful character it is useful. The progress of growth of undoubtedly carcinomatous nature may be thus retarded, and incidental inflammatory symptoms in the adjoining tissues successfully combated; but beyond this, capillary depletion has no power. The number of leeches applied must be regulated by the size of the tumor; it should vary between twelve and six; a smaller number causes an afflux of fluids to the part without emptying the vessels sufficiently. When the tumor is adherent to the skin there is danger in continuing this practice, as the bites have frequently been known to pass into persistent ulcerations. M. Bégin, whose confidence in the powers of local depletion would be more encouraging were it not for his belief in the inflammatory nature of the disease, applies leeches even to ulcerated surfaces.

As an effectual method of lowering the nutrition of cancerous parts, the *ligature of the arteries*, or rather chief artery, leading to them, was advised by Maunoir¹. Applied by this practitioner more especially to sarcocele, it had, at an earlier period (Lucas in 1814), been made trial of in this country in cancer of other parts, but not with very encouraging results². It is manifest, in truth, that unless in situations receiving their blood from a single source, the anastomatic supplies must soon undo what has been done by the operation. Yet Dupuytren, believing that erectile tissue always exists in smaller or larger proportion in encephaloid tumors, practised ligature of the principal artery, when he conceived the cancerous matter had a very small

¹ Nouv. Méthode de traiter le Sarcocèle, 1820.

² A. Cooper, Essays, part i. p. 184; 1818.

share in the composition of the foreign growth. M. Magendie¹ states that he tied the carotid with the effect of permanently stopping the growth of an enormous scirrhonecephaloid tumor on the side of the head and face, which had twice been reproduced after partial ablation. M. Jobert has recently modified this method, adding to the ligature of the principal vessels that of the nervous filaments connected with the cancer. He has thus cured, he informs us, four ulcerated cancers of the lips, and one of the tongue².

[In order to further illustrate this subject we subjoin the following case, lately published by Dr. Hosack of New York, which we had the satisfaction of seeing. The patient was a female aged fifty-five; "She had been affected with scirrhus of the parotid gland between three and four years. Its growth had been gradual; the first inconvenience which she experienced was that of a restriction upon the motion of the jaw, which continued to increase with the growth of the disease, until she was unable to open her mouth further than to admit the smallest sized teaspoon. The tumor had at this time attained to a considerable size, protruding from behind through the space [posterior to the angle of the jaw, occupied by the parotid, extending itself over the masseter muscle quite up to the zigoma, carrying before it the lobe of the ear, and encroaching so much upon the external meatus as to close it entirely. Upon enquiry she informed me that she had been a patient at the New York Hospital for the space of two months, and while there the surgeon had kept her constantly under the use of iodine both externally and internally, but without the least benefit; and finding the sight of the right eye becoming seriously affected, as she supposed, from the use of the above medicine, she requested to be discharged. She also remarked, that since leaving

¹ Phén. Physiques de la Vie, t. i. p. 119.

² Brit. & For. Med. Rev. vol. ix. p. 260; 1840.

the hospital, which was about two years ago, the tumor continued steadily to increase.

“Having fully satisfied myself of the true nature of the complaint, I proposed tying the common carotid of the side affected, assuring her that I fully believed it would cure the disease; whereupon she immediately assented to the operation, which was done upon the 21st day of May, 1839, in the presence of my friends Dr. Wilkes, Dr. Mason Warren of Boston, Dr. Foster, and several gentlemen of the profession. The taking up of the artery caused the patient little or no inconvenience; the wound healed in the usual time with the exception of that part occupied by the ligature, which came away on the thirty-fifth day¹. A perceptible diminution of the tumor was observed in the course of a month after the operation, which continued gradually to decrease until the disease wholly disappeared. She is now enabled to open her mouth to its full extent, and masticates her food without the least difficulty.” By referring to a plate which accompanies the paper, Dr H. says, “it will be observed that not only has the tumor been entirely absorbed, but a depression actually exists, in form precisely like that of the gland in its natural state, thereby showing its complete removal, together with that of the disease.”

Dr. Hosack tied the carotid in a second case of a similar character, which although it was not followed by so favorable a result as the first case, it succeeded in arresting the growth of the tumor and relieving the sufferings of the patient. —W.]

Methodic *compression* of carcinomatous tumors, introduced and declared to be singularly efficacious by Young, subsequently rejected by the profession, from the unfavorable estimate formed of it at the Middlesex Hospital², has of

¹ The usual time being prolonged in consequence of the absorbents acting with less vigor in so advanced a period of life.

² C. Bell, Surg. Obs. vol. i. p. 4; 1816.

late years been experimented on a very large scale by M. Recamier. The more important part of his results is as follows : "Of one hundred patients, sixteen appeared to be incurable, and underwent only a palliative treatment : thirty were completely cured by compression alone, and twenty-one derived considerable benefit from it : fifteen were radically cured by extirpation alone, or chiefly by extirpation and pressure combined, and six by compression and cauterisation : in the twelve remaining cases the disease resisted all the means employed." The compression should at first be exceedingly gentle, and have the effect simply of supporting the tumor in close apposition with the subjacent parts. In proportion as the morbid mass becomes habituated to its action, the pressure is increased and gradually rendered exceedingly powerful. The greater the tendency to irritation in the growth itself, and in the surrounding tissues, the more important is it to attend to this precaution. M. R. generally employs perfectly smooth disks of agaric, laid over each other, and retained *in situ* by a roller, as the compressing materials. M. Bégin sometimes substitutes a laminated plate of lead, modelled to the tumor, and surmounted with a pyramid of graduated compresses. This application (which is far from a novel one) frequently becomes painful, and cannot be endured. M. R. recommends a renewal of the apparatus every day, or every second day : M. Bégin thinks it better to change only when the bandages grow loose, and prefers, in consequence of this view, an elastic corset, capable of accomodating itself to the decreasing size of the part, as the compressing agent, wherever circumstances admit of its use. The treatment should be continued for a considerable time after the resolution of a tumor.

The conditions interfering with the success of this plan are, according to M. R., excessive magnitude of the morbid growth ; the existence of cavities in its interior ; the conver-

sion of the tissue of the diseased organ itself into carcinoma ; a state of softening, ulceration, or fungous vegetation ; the extension of the disease beyond the reach of direct compression ; obstinate local neuralgic pains, and great fulness of person.

It can hardly be contended, as we have already stated, that some of the growths thus benefited or cured were not really scirrhus ; and the testimony of Mr. Travers¹ is favorable to this mode of treatment. Nevertheless the best proof of the general inefficacy of the plan is, that at Paris, where we should naturally look for the greatest number of converts, scarcely a single hospital surgeon now resorts to this mode of treating scirrhus tumors. We only remember to have seen it tried once, in the course of two years, by M. Roux, and in this instance he made the trial at the importunate solicitation of the patient. Mr. S. Cooper has recently used compression in one case at University College Hospital,—it seemed only to hasten the establishment of ulceration. There is an easy source of error in the absorption of the surrounding natural tissues, which is undoubtedly produced. Perhaps the strongest objection to the general application of the plan is that, by buoying up the hopes of patients, it induces them to decline the operation till too advanced a period of the disease.

That the external use of *iodine*, in the form of ointment, sometimes completely removes tumors, possessing the characters of scirrhus, where it has been had recourse to at an early stage of their development, is a fact of which we have witnessed some examples. The truly cancerous nature of such growths may of course be questioned ; yet a trial of iodine externally, provided the part be indolent, and its use excite no irritative action in the tumor, is certainly advisable : the length of the trial should be regulated by the apparent influence produced on the tumor. An excellent

¹ Loc. cit. vol. xvii. p. 306.

ointment is composed of five grains of iodine, and a drachm of the ioduret of potassium, to an ounce of prepared lard. The ioduret of lead is sometimes well borne, where the former combination proves irritating.

Mercurial ointment and plasters, and even repeated *dry friction* of the tumor, have had their advocates; but such means are not at the present day employed¹.

Caustics of various kinds have, from the earliest times, been employed for the destruction of ulcerated cancer. The *actual cautery* was probably, according to Bayle, the first agent used for the purpose². The French surgeons still occasionally employ it, especially for the removal of fungating excrescences, and sometimes, as an additional security, burn the wound after the removal of a cancerous mass. In our own country there is a just repugnance to the actual cautery, and it has fallen completely into disuse³.

Caustic potass, the *bichloride of mercury*⁴, the *chloride of antimony*, and the *nitrate of silver*, are among the caustic substances which have enjoyed more or less reputation for their effects on cancerous ulcers. The *acid nitrate of mercury*, made by dissolving one part of proto-nitrate of mercury in eight of nitric acid, is a favorite escharotic

¹ Suckling toads was a popular remedy about half a century ago in our own country in cases of mammary cancer, at least, if we may judge from one of the private letters of Junius to Woodfall, who, alluding to the Princess-Dowager of Wales, at that time afflicted with a cancer, that destroyed her in 1772, mentions that "she suckles toads from morning till night."—*Mason Good*.

² Hippocr. Epid. lib. vii.

³ A curious mode of applying heat to these surfaces was devised by Le Comte. It consisted in cauterising with the rays of the sun, collected by a powerful lens: this eccentric process is said to have been attended with success in one case of cancer of the lower lip.—(*Mém. de la Soc. Roy. de Méd.* 1776.)

⁴ See a paper, by M. Ordinaire, on the treatment of ulcers of various kinds with corrosive sublimate, in *Gaz. Médicale*, Novr. 1839.

in the French hospitals: and is especially lauded by Re-
camier as possessing a marked affinity for the diseased
tissue, and as producing healthy granulations, even on a
cancerous basis. *Arsenious acid* has long formed the
chief agent in numerous preparations, both empiric and
professional, for the destruction of cancer. In the arti-
cle ARSENIC, Cycl. Pract. Surg., the composition of some
of these preparations, among others that recommended by
Dupuytren, is stated.

Within the last few years the *chloride of zinc* has been
introduced to the notice of practitioners as an escharotic
by M. Cancoin, and experimented on in this country with
very favorable results by Mr. A. Ure¹. From the relation
given by the latter gentleman, it appears to produce a rapid
and salutary change on the characters of corroding ulcers,
and in at least one instance, to have successfully enucleated
a large non-ulcerated scirrhus tumor of the mamma. In
the latter instance there has, Mr. Ure informs us, been no
relapse. In two cases of cancerous ulceration of the face,
where the disease, though of long standing, was superficial,
it acted most favorably in the hands of Mr. Lawrence, and
the cures have been permanent². The preparation em-
ployed by Mr. Ure is a combination of one part of the
chloride to two of sulphate of lime: M. Cancoin mixes the
salt with various proportions of flour. The thickness of
the layer of paste must be proportional to the depth of
eschar required to be produced. Its immediate effect,
according to Mr. Lawrence, is that of a powerful stimulant,
causing great vascular excitement, with swelling, bright
redness, and severe pain, the last continuing twenty-four or
forty-eight hours, or even longer.

The *chloride of gold* appears to have produced mar-

¹ Med. Gaz. 1836, vol. xviii. p. 287.

² Grosse, in Trans. of Prov. Assoc. vol. v. p. 61.

vellous effects in the hands of M. Récamier. A woman affected with fungating cancer of the cervix uteri, which had already destroyed almost the entire of that portion of the organ, underwent seven or eight applications of this caustic: the local and general symptoms yielded completely; the ulceration ceased; the body of the organ, which had been engorged, lost its unnatural size; the lancinating pain and hæmorrhages were no longer complained of. This caustic is prepared by mixing nitrochloric acid (aqua regia) with pure chloride of gold, in the proportion of one ounce of the acid to six grains of the salt¹. Notwithstanding all this M. Recamier has, it would seem, given up this chloride for that of platina².

As a general principle, these agents should be applied in such manner as to produce the requisite effect, if possible, by a single application, otherwise the irritation produced, gives new activity to the disease. In superficial cancerous ulcers of the skin, in cases where carcinomatous matter appears in the cicatrix after operation, or where some suspicious tissue has been accidentally left behind, and the patient refuses to submit to further use of the knife, they may be safely and advantageously used. But in cases of glandular cancer they are wholly inapplicable as a general truth: the agony they cause is infinitely greater than that produced by the knife, and there can be no certainty that every particle of the diseased formation is removed. Fatal results have occurred from the absorption of arsenic, and in the article on uterine cancer, the serious accidents, to which other species of caustics have given rise, are noticed. Many of these objections do not apply to the chloride of zinc.

Kreasote has been made favorable mention of by Gräfe³.

¹ Rev. Méd. 1835, t. ii. p. 380.

² Pauly, Mal. de l'Utérus, p. 345.

³ In seinem und Walther's Journ. b. xx. s. 151.

A case of extensive cancer of the face and arch of the palate is stated by this observer to have been remarkably improved in condition by the application of this substance. It may be applied either pure or diluted with water; it does not produce much pain¹.

The inoculation of the matter of *common and of hospital gangrene* has been practised, with the design of imitating the natural process of cure before referred to².

Various preparations of *lead* have been from time to time extolled as specifics for scirrhus. Gonlard affirmed that he had cured ulcerated cancer with them; Brambilla extols the virtues of a plaster composed of minium, olive oil, and turnip juice; Gesner³ ascribes singular virtue to the acetate made into a liniment with turpentine. The calmer judgment of Bayle has limited the real value of these preparations to their sedative action: as exercising this action in a marked manner, he recommends a combination of six drachms of "litharge of gold," six drachms of vinegar, and two ounces of olive oil, to be spread in a thin layer on the ulcerated surface.

Counter-irritation, in the form of blisters, issues, or setons, has occasionally appeared to produce beneficial effects; but such result is not to be always looked for, and there may be positive mischief in its employment. M. Cruveilhier⁴ refers to a case in which a blistered surface became cancerous, a circumstance already adverted to.

In the strictly *palliative treatment* the two main indications are to relieve pain and remove fetor. Almost all the dressings for cancerous sores have been devised with a view to the fulfilment of one or other of these indications.

¹ See also Marchal, Gaz. Méd. de Paris, p. 107; 1835.

² See Cruveilhier, Essai sur l'An. Path. t. i. p. 128.

³ Beobachtungen, b. v. s. 141.

⁴ Livrais. xxvii. Mammelles, p. 4.

Some surgeons give the preference to hemlock poultices made of the recent plant as a sedative application ; bruised carrots also ease pain and correct fetor. The latter vegetable was first brought into notice by Sultzer in 1766, and, *more solito*, announced as possessing the power of radically curing the disease. Boiled figs and vegetable charcoal have been used with similar views ; some practitioners simply cover the part with compresses steeped in laudanum ; fomentations of stramonium leaves are mentioned by Dr. Warren. Decoction of cinchona with tincture of myrrh is found a serviceable application where the surface is flabby and disposed to bleed. In the course of a protracted disease like cancer it will of course be found necessary to change the species of dressings. Their temperature may be regulated by the patient's feelings ; but much warmth is said to stimulate the growth of the disease.

The chlorurets of lime or soda are useful in removing fetor, and are said to produce a good effect occasionally on the surface of the ulcer. Dr. F. Churchill of Dublin has recently recommended injections of a solution of nitrate of silver with the same view in cancer of the uterus ; they likewise diminish, it is said, the irritability of the ulcer and lessen pain.

Hæmorrhage is occasionally productive of temporary alleviation of pain, and when moderate in quantity and of rare occurrence is therefore rather favorable than otherwise. Under other circumstances it is of course necessary to stop it, which is often a task of much difficulty. When depending on capillary effusion, pressure is the most likely means of arresting it ; when from the perforation of an artery, ligature of the vessel is indicated. This should be practised outside the morbid growth. Mr. Travers was in one instance obliged to tie the carotid to stop the bleeding from an encephaloid tumor at the angle of the jaw.

In the *general treatment* of subjects laboring under cancer, our object, according to Dr. Copland, must be "to support the energies of life by exciting the digestive functions and the abdominal secretions and excretions, and to impart vigor to the frame by suitable diet and regimen." For these purposes he recommends tonic infusions with liquor ammoniæ acetatis or with the alkaline carbonates and conium or hyoscyamus; bichloride of mercury in the compound tincture of cinchona or compound decoction of sarsaparilla; or small doses of blue pill or hydrargyrum cum cretâ with camphor and some one of the narcotic extracts: the phosphates of iron combined with conium, or the sulphates of quinine and zinc. The condition of the bowels must be carefully watched and due alvine action obtained by mild aperients, or laxative enemata. The internal use of opium and its preparations, especially of the salts of morphia (the bimeconate would appear to possess some particular claims to notice in this disease) must be had recourse to for the relief of pain; but the longer the exhibition of anodynes can be postponed the better. The ill effects of opium on the stomach and bowels have led to a trial of the salts of morphia by the endermic method, and, as it is alleged, with excellent results. The cuticle should not, of course, be removed for the purpose in the immediate vicinity of the disease.

The *diet* of cancerous patients should be regulated by their capabilities of digestion; the mere cramming of food into a stomach incapable of aiding in its assimilation is as positively deleterious, as the system of starvation enforced by the practitioners of the Broussaisian school. The advantages of rigid abstinence have, it is true, been enforced on purely practical grounds: Pouteau flattered himself he had radically cured several patients by limiting their nourishment to five or six pints of ice water daily for a period of about two months; Pearson and Lambe in this

country and Hufeland in Germany were also advocates for extreme restriction in diet. At the present day starvation is frequently enforced as an adjunct to the local antiphlogistic treatment; but though patients are by these means rapidly reduced to a state of marasmus, their cancers flourish as before. Such treatment promotes the rapid occurrence of debility and sinking, which unfit the organism wholly for combating with the destructive influence of the disease. Suffice it to say that experienced practitioners in this country are agreed as to the appropriateness of a light, easily digestible, succulent diet, where no special circumstance exists to contraindicate it. Stimulants of all kinds are decidedly injurious. The hygienic condition of the patient generally should be carefully attended to, cheerfulness of mind promoted as far as possible, and participation in private and public amusements, so long as circumstances admit of this, enjoined. Whether change of climate possess any influence on the progress of carcinoma is an unsettled point. Unless at the very outset of the disease, and more particularly as a prophylactic measure, little is, we fear, to be hoped from it. It might be coupled with the use of mineral waters; those of Karlsbad, Marienbad, Ems, &c. are recommended by the German authors¹. In a small number of cases referred to by writers, where the patients removed at an advanced stage of the disease from a cold to a warm latitude or *vice versâ*, no apparent amelioration resulted from the change: "*cælum non morbum mutant qui trans mare currunt.*" But no fair inference can be drawn from such cases.

Ablation. — On the importance of having early recourse to ablation, we have already insisted; it remains for us to consider the circumstances which in particular cases con-

¹ The particular water to be recommended, will of course vary in different cases.

tra-indicate the operation, and some other points connected with it.

Prudent surgeons will not advise removal of carcinoma, — 1, when such adhesions or local extensions of the primary disease exist, as would render it impossible to remove the mass completely either by excision or by amputation of a limb ; 2, when the disease is manifestly spreading or in a state of active growth ; 3, when the existence of internal carcinoma is even probable ; 4, when the cancerous cachexia is thoroughly established ; 5, when the disease has existed for a number of years in an almost stationary condition ; gives rise to no serious derangement of health, and is rather an inconvenience than a malady. To these prohibitory conditions should be added, in the majority of cases, enlargement and induration of the lymphatic glands in communication with the diseased part ; such condition, however, does not amount to an absolute contra-indication of the operation, though it diminishes materially the chances of success ; the change in these bodies may be simply irritative, and disappear after the removal of the primary disease, and they have, when really cancerous, been successfully excised. Desault, Amussat, Lisfranc, and others appear to think enlargement of the glands hardly any hindrance to ablation, when recent¹. Extreme debility, provided it depend on pain and repeated hæmorrhage, and do not coexist with the cachexia, though diminishing the probability of success, does not absolutely ensure failure : it rests with the surgeon to balance the dangers of the operation against the degree of strength and vital energy of the patient, and act accordingly. The same consideration is applicable in cases of very advanced age, and where the manual part of the operation or its immediate consequences are attended with serious risk to life. The presence of even extensive ulceration did not, in several cases

¹ Gaz. Méd. de Paris, 1835, p. 143.

on record, prevent a fortunate issue to the operations ; but with respect to the cachexia, few practical surgeons will deny the general truth of the proposition above laid down, although in a few instances which may be found scattered through works from the time of Morgagni¹ downwards, ablation has been followed by disappearance of the general state thus designated. In some of these cases, too, the symptoms may have been really those of a *false cachexia*, a subject excellently handled by M. Recamier.

Admitting that we have a case to deal with in which no formal contra-indication to the performance of the operation exists, the time when it ought to be undertaken remains to be determined. In general terms, we should say the moment the cancerous nature of the disease is established : provision is thus made for a moderate trial of such means as are known to exercise evident influence on inductions simulating carcinoma. The habit of temporizing has more than any other cause brought operations for cancer into discredit ; and in cases of encephaloid disease the necessity for prompt action cannot be too strongly enforced, nor should our being obliged to amputate a limb to remove the morbid growth prevent us from urging the patient to submit, before it is too late. It may be objected that, acting on this principle, non-cancerous diseases of a comparatively innocuous character have been erroneously removed, — that simply hypertrophous mammæ have been cut out as affected with scirrhus. We admit the fact, but to us it seems infinitely better to run the chance of uselessly removing, in very rare instances, an organ of the sort, than of leaving a true scirrhus to destroy the patient.

So far we have spoken of the operation as a means of radical cure ; but it may perhaps become allowable as a palliative, — as likely to prolong life and conduce to a

¹ Ep. 50. Art. 16.

comparative *euthanasia*, in certain cases, where the agony endured and the abundance of the hæmorrhage are rapidly wearing out the existence of the sufferer. This is the more true, as in some cases which, had they been permitted to run their own course, must, to all appearance, have terminated fatally in a few weeks, an operation executed under these most disheartening circumstances has added several months, nay some years, to life. These, however, are occurrences of extreme rarity; and unless the patient be determined to submit to the knife with a full consciousness of the comparatively slight benefit he is entitled to expect from his submission, the operation should not be had recourse to: the surgeon may *yield* to the entreaty of the patient, but cannot conscientiously *advise* removal.

The extirpation of cancer has been effected with caustics, by ligature or with the knife. Enucleation of non-ulcerated carcinoma with arsenical preparations is no longer undertaken by educated practitioners; but, as we have mentioned, the chloride of zinc has been successfully used for this purpose of late years by Mr. Ure. It was formerly much the habit to remove these growths by ligature when attached by a narrow base, and Recamier is of opinion that carcinomatous vegetations are less prone to return when thus removed than when cut away. Where there is reason to dread obstinate hæmorrhage, as in the instance of circumscribed tumors in the rectum, this mode of operating has its advocates. These are, however, exceptional cases; in all others the knife is to be preferred, and is in the majority the only possible means of removing the entire disease. Some practitioners recommend the repeated application of leeches before the operation, for the purpose of removing an inflammatory action in the vicinity of the tumor and of diminishing its own size: compression is by others advised with the same view. These practices, admitting that they have the desired effect, seem very

likely to induce a false estimate of the extent to which the elementary molecules of the cancer may extend, and hence of causing some of the morbid matter to be left behind. Sir A. Cooper strongly advises an alterative course of Plummer's pill before operation; this idea of the utility of constitutional treatment seems to have been entertained at a very early period, as the following passage shows: "*Galenus autem sectionis tantum chirurgiam admittens, in hunc modum tradit. Si quando cancrum manuum et scalpellum opera curare ausus fueris, vacuationem ab atræ bilis purgatione auspiceris*!."

In the performance of the operation the most important point to be borne in mind is the absolute necessity of removing every particle of diseased matter; and in order to ensure this result, a stratum of healthy tissue should if possible be removed along with the morbid growth: for this purpose it may be necessary to extirpate an organ or amputate a limb. It is decidedly advantageous that the wound should be united by first intention, but the surgeon should not run the risk of retaining implicated skin to effect this object. When extensive excision of skin is required, the resulting hiatus may be closed up by a plastic operation.

Efforts have been made to devise a means of modifying the constitution after operation so as to avert reproduction. With this view, exhibition of alterative medicines, occasional small blood-letting, the establishment of issues, &c. have been recommended, but such modes of treatment have not been distinctly productive of the desired effect: M. Rayer, however, "has fancied" that relapses are less frequent after removal of cutaneous cancer, when an issue has been previously made in either extremity². M. Recamier recommends pressure, but if the tendency to relapse

¹ P. *Ægineta*, vi. 45, p. 463. Ed. Basil.

² *Dis. of Skin*, translat. by Willis, p. 270.

be strong, we fear little is to be hoped from the practice. Change of climate is now, if under any circumstances, likely to be beneficial.

A few years since M. Martinet published some cases in which the return of the disease after ablation was alleged to have been prevented by the aid of plastic surgery. Having attempted to restore by rhinoplasty the portion of a nose which had undergone cancerous ulceration, and given origin to fungous excrescences in spite of excision, the actual cautery, and arsenical paste, he was astonished at the rapidity and permanence of cicatrization. In three other cases he performed an analogous operation and with similar success. Although here we have not a sufficiently extended experience to prove the general value of the plan, yet the results obtained certainly merit attention. Three of the patients were seen three and six years after the operation in perfect health; the fourth died two years and a half after its performance of an affection unconnected with her cancer: yet that these were instances in which the disease was likely to prove fatal in the ordinary course of things appears from its previous progress in each, especially from the fact, that in three of them there had already been relapse after operation, in two recurring even twice. M. Martinet's process consists in "applying a sound, well-nourished flap of skin, taken from a more or less distant part, on the wound resulting from the excision of a cancer, either immediately after the operation or after the development of granulations:" in his own cases he proceeded in the latter manner¹. The account given by the French surgeon does not appear to have encouraged others to similar attempts; at least Zeis and Blandin, the most voluminous writers on Plastic Surgery, do not allude to their having been made².

¹ Gaz. Méd. de Paris, No. 42, 1834.

² Plastic operations have frequently been performed after the re-

[We subjoin the following statistics extracted from the London Lancet purporting to be the experience of a number of surgeons in France, and collected with much care by M. Le Roy d'Etiolles.]

“Of 2781 cases occurring in the practice of 174 surgeons, 1227 happened in individuals above forty, and 1061 to others above sixty years of age. The cases of cancer of the uterus were about thirty per cent.: of the breast twenty-four per cent. Cancer of the mouth was in women only as one to one and a half per cent., while in men (probably from the use of the tobacco-pipe) it was as much as twelfth-six per cent. Cancers supposed to have been of hereditary transmission figured only as 1 in 278 (?); while those induced by scrofula were as 1 in 10; and by syphilis as 1 in 5.

“The most useful part of the inquiry is that which is brought to bear on the utility or otherwise of operating on cancers. Out of 1172 patients not operated on, 18 lived more than thirty years after the first appearance of the disease; while out of 801 operated on by excision or caustic, the existence of only four was prolonged for a similar lapse of time; 14 patients operated on, and 34 not operated on lived for a period of from twenty to thirty years; and 88 in the first category, and 228 in the second, lived from six to twenty years after the first appearance of the disease. The ordinary duration of life after this period among persons not operated on, is said to be five years for men, and five and a half for women; while among those operated on, it is no more than five years and two months for men, and six years for women.

“From these results the natural conclusion is, that the removal of cancer of the face, with a view to remedy deformity, and with results in respect of permanent cure, which invite attention to M. Martinet's opinions. Vid. Zeis. Handb. der Plast. Chirurg. s. 367, and Blandin, De l'Autoplastie, p. 256.

ablation of cancer (leaving out of account the risks attending the operation itself) does little, even when successful, to prolong life, and is therefore (in France, at least) of very questionable utility. Results like these, startling as they may seem, and however they may demand subsequent corroboration, are, at least, indications of the light which statistical science is enabled to throw upon the actual and relative value of many of the aids in medicine and surgery, of which we at present avail ourselves."

In order to draw a just conclusion in regard to the good to be derived from a surgical operation, these statistics should inform us at what period of the disease the operation was resorted to. If at an advanced stage, it would probably be accelerated, and it is well known that many cases which present themselves at public institutions are liable to this objection. It must also be kept in view, that the removal of cancer is frequently resorted to as a palliative either to relieve excessive pain, or to prevent fatal hæmorrhage. Another circumstance of not inconsiderable importance is that in at least one half the cases, the disease reappears not at its original seat, but the patient sinks away quietly, under an affection of some of the internal organs, the nature of which is unknown both to themselves and their friends. They are thus saved from the painful and disgusting death that attends cancer, when allowed to proceed in its natural course to a fatal termination. — W.]

Before closing this section of our article we shall briefly advert to a few general questions of importance. Among these is the degree of relationship of the three species of carcinoma. The differences of these products may first be exhibited tabularly.

ENCEPHALOID

Resembles lobulated cerebral matter.

Is commonly opaque from its earliest formation.

Is of dead white color.

Contains a multitude of minute vessels.

Is less hard and dense than scirrhus.

Is frequently found in the veins issuing from the diseased mass.

The predominant microscopical elements are globules, not always distinctly cellular, and caudate corpuscula.

Occasionally attains an enormous bulk.

Has been observed in almost every tissue of the body.

Very commonly coexists in several parts or organs of the same subject.

Is remarkable for its occasional vast rapidity of growth.

Is frequently the seat of interstitial hæmorrhage and deposition of black or bistre-colored matter.

When softened into a pulp appears as a dead white or pink opaque matter of creamy consistence.

Subcutaneous tumors are slow to contract adhesions with the skin.

Ulcerated encephaloid is frequently the seat of hæmorrhage, followed by rapid fungous development.

The progress of the disease after ulceration is commonly very rapid.

Is the most common form under which secondary cancer exhibits itself.

Is the species of cancer most frequently observed in young subjects.

SCIRRHUS

Resembles rind of bacon traversed by cellulofibrous septa.

Has a semi-transparent glossiness.

Has a clear whitish or bluish yellow tint.

Is comparatively ill supplied with vessels.

Is exceedingly firm and dense.

Has not been distinctly detected in this situation.

The main microscopical constituents are juxtaposed nuclear cells; caudate corpuscula do not exist in it.

Rarely acquires larger dimensions than an orange.

Its seat, as ascertained by observation, is somewhat more limited.

Is not unusually solitary.

Ordinarily grows slowly.

Is comparatively rarely the seat of these changes.

Resembles when softened a yellowish brown semi-transparent gelatinous matter.

Scirrhus thus situated usually becomes adherent.

Scirrhus ulcers much less frequently give rise to hæmorrhage, and fungous growths (provided they retain the scirrhus character) are now more slowly and less abundantly developed.

There is not such a remarkable change in the rate of progress of the disease after ulceration has set in.

Is much less common before puberty.

COLLOID

Has the appearance of particles of jelly inlaid in a regular alveolar bed.

The contained matter is strikingly transparent.

Greenish yellow is its predominant hue.

(Its vessels have not been sufficiently examined as yet.)

The jellylike matter is exceedingly soft; a colloid mass is, however, firm and resisting.

The pultaceous variety has been detected in the veins.

Is composed of cells in a state of *emboitement*.

Observes a mean in this respect.

Has so far only been seen in a limited number of parts.

Has rarely been met with in more than one organ.

Grows with a medium degree of rapidity.

Undergoes no visible change of the kind.

Has so far been observed in adults only.

The number and variety of these distinctive characters seem to require the separation of these adventitious products as distinct species; while they are insufficient to counterbalance the weighty reasons for uniting them into a genus afforded by their fundamental similarity. So true is the latter statement, that some eminent pathologists, as has already been intimated, regard these formations as one and the same primarily, founding their opinion more especially on the following facts. 1. The different species are found coexisting in different organs in the same subject. 2. They are even met with in one and the same organ in close proximity. 3. After the ablation of a cancerous tumor, the reproduced growth frequently belongs to a different species from the original: thus encephaloid follows scirrhus; scirrhus more rarely encephaloid (Müller); encephaloid appears in distant parts after the removal of colloid¹. 4. In the hard state encephaloid and scirrhus are not to be distinguished by their physical characters. 5. Structure possessing the appearance of scirrhus may soften into true cerebriiform pulp. This is little more than another way of expressing the fourth argument.

The accuracy of the first three positions is incontestable; they prove the close alliance of the formations referred to, but by no means demonstrate their identity. It must also be admitted that encephaloid, when in the state termed crude by Laennec, instead of being opaque and whitish sometimes displays a semi-transparent bluish tint, is extremely hard, and presents but little visible vascular development—characters approximating it to true scirrhus. Attempts have, however, been made by M. Trousseau and M. Rouzet to establish the distinction even under these circumstances. M. Trousseau points out that the grain of encephaloid is larger and less resisting than that of scirrhus, and that the former structure does not, as the

¹ Cruveilhier, Livrais. v. Testicule.

latter, creak when divided with the scalpel: M. Rouzet observes that the surface of a section of encephaloid instead of remaining plane, as is the case with scirrhus, springs into irregular elevations, and presents a number of mamillary prominences separated by depressed interstices. These observations are, as may very readily be ascertained, well founded; but we agree with Professor Bérard in thinking, that when the characters in question appear in encephaloid, that product is perfectly distinguishable at first glance from scirrhus. Yet admitting, as is the fact, that a specimen of hard carcinoma may be shown to an anatomist without his being able to determine whether it would have ultimately presented the apple-juice-like appearance of softened scirrhus or the creamy aspect of diffuent encephaloid, it is still evidently going further than is warrantable to conclude from such inability that the distinction does not really exist. The progress of micrography has shown that certain substances, considered identical by observers misled by gross physical characters, are in reality extremely different: a single instance of this — the long subsisting confusion of softened fibrine and pus — is a sufficient illustration. Respecting the softening of scirrhus into matter of encephaloid aspect, the presumed occurrence of which, however, may in reality depend upon the inability just spoken of — we have already ventured on a hypothetical explanation, apparently less irreconcilable with facts than that for which we desire to substitute it.

The reader will determine for himself whether the particular properties of colloid justify its separation as a species. For our own part we can entertain no doubt that, even without taking into consideration the marked peculiarity in the mode of development and growth of its microscopical elements, the position we have assigned this structure is a more just one than that given it by Otto, Recamier, and Carswell, as a variety of scirrhus, or by Dr.

Hodgkin, who considers it "identical with, or bearing the closest relation to fungoid disease."

The degree of affinity of carcinoma and certain morbid formations next requires to be noticed.

The majority of writers regard *multilocular cysts* (the more usual anatomical character of the disease erroneously termed ovarian dropsy) as totally unconnected with cancer. Cruveilhier and Dr. Hodgkin do not acquiesce in the common opinion. The French observer unhesitatingly classes ovarian cysts with carcinoma, particularly with the colloid species, affirming that it differs from the ordinary form of this disease simply by the greater size of its meshes. But here is, as we believe, vicious generalization: the general appearance of encysted masses is otherwise extremely distinct from that of colloid cancer; they have neither the regularity of form or arrangement in their loculi, nor the uniformity in the contents of these, so remarkable in the latter formation. Besides, as is well known, these ovarian cysts may acquire very considerable size without affecting the economy in the slightest degree except by the mechanical hindrance to the performance of certain functions: they possess neither the power of converting the adjoining tissues into their proper substance, nor of producing a particular form of cachexia; and M. Cruveilhier would be puzzled to find a case of encysted ovary attended with the local and general symptoms of cancer, unless deposition of encephaloid or scirrhus had taken place in its structure. Further, M. C. is far from consistent; for while he regards the septa of colloid as formed of the walls of dilated veins, he considers the primary loculi of encysted ovary as constituted by the vesicles of the part in a state of dilatation¹: yet the two structures are declared to be iden-

¹ This is the only fair inference from the article "Kystes" in the 5th Livraison; but in Livraison xxv. (Ovaire, p. 2.) he affirms that the areolar cysts of the ovary are seated in the venous erectile rete of that organ.

tical. Again, we find in this author's classification of ovarian cysts a distinct class characterized by being developed on a cancerous basis; surely, if the multilocular cyst be itself a cancer, this is a most defective ground of distinction. Dr. Hodgkin on his part assuming that the multilocular ovarian cyst is the type of cancerous structure, is obliged to include the two forms of disease in the same anatomical category; he considers that there is in fact "no appreciable difference either in the structure and arrangement of the cysts of gum cancer and encysted ovary or in the composition of their contents." (p. 291). Nevertheless he formally denies the "malignant" character of the ovarian multilocular cyst. Now he elsewhere (e. g. p. 268) makes the presence of the cystiform arrangement a test of "malignity, but as the disease of the ovary in question possesses this arrangement in the most distinct manner, it follows that it is malignant:" hence the same formation is at once "malignant" and "non-malignant." For our own part we reject multilocular cysts from the class Cancer; where pathology is made the co-groundwork of classification with anatomy, this could not be otherwise.

Two opinions respecting the relation of cancer and *fibrous growths* have already been noticed (p. 20.); a third originates with Dr. Hodgkin. Presuming further on the infallibility of his test of "malignity," this observer affirms that in consequence of their "possessing the structure of compound adventitious cysts," there is inaccuracy and fallacy in applying the term "fibrous tumors" to the well known bodies developed in the parenchyma, or under the serous or mucous investitures of the uterus—that these are in truth "scirrhus malignant growths¹." This opinion directly clashing with the experience of Meckel, Bayle, Laennec, Louis, Andral, Cruveilhier, Dupuytren, Sebas-

¹ Guy's Reports, vol. i. p. 334.

tian, R. Lee,¹ Carswell, &c., is fully examined in the article FIBROUS TUMORS, Cycl. Pract. Surg.

M. Cruveilhier, pushing to their extreme point his notions respecting the seat of carcinoma in the veins, affirms that in respect of structure, *erectile tissue* and cancer are one and the same; that after the former has been freed from blood, and the latter from the cancerous juice, they cannot be distinguished from each other. In fact to use his own words, "cancer is a varicose tissue, the meshes of which are filled with blood²." Hence the presence of the cancerous juice constitutes their sole distinctive character: now elsewhere this author declares that the only difference between scirrhus and certain fibrous tumors is the characteristic juice of the former. The evil of bold generalization is here strikingly manifest; for it follows from these opinions, that as fibrous and erectile tumors differ from the same by the same, they are themselves identical.

Respecting *melanosis* we have already spoken: for the consideration of the subject of corroding and intractable ulcers we beg to refer to the observations on cancer of the skin and uterus.

Much contradictory matter has been written on the question, whether "malignity" is inherent in and peculiar to carcinoma, or accidental and capable of being manifested under various conditions. The disputation on the subject has mainly arisen from the variety of meanings attached to the term. Uniformity of opinion cannot subsist on the point, while some designate as "malignity" the sum of the properties of cancerous tissues, others use the word as a synonym of incurability³; others with Dr. Hodgkin apply

¹ Krull, Diss. de Nat. et Caus. Tumor. Fibr. Uteri, p. 27. Groningæ, 1836.

² Livr. xxx. Veines, p. 3.

³ "Malignant, by which term I mean incurable," (Travers), a notion amplified by others into the mysticism — "a malignant dis-

it to the combined characters of encysted structures, and the majority attach a vague meaning to it which they are totally unable to define: and yet grave authors of the latter class actually fractionize the unknown quantity, and write about "*semi-malignity*." As the perpetuator of much misapprehension the term should, we think, be altogether given up; if, however, it be understood as signifying the power of a morbid growth at once to assimilate different tissues to its own substance, to produce similar disease in distant parts, to reappear after destruction and give rise to a peculiar cachexia, it can be justly applied to cancer alone. If the microscopical composition of adventitious growths be urged as an argument against this statement, if it be said that different properties cannot appertain *ab origine* to growths which are identical in the nature of their elementary constituents, we can only repeat the answer already made to Müller's doctrine of homologousness: though the isolated microscopical fragments may be identical, the union of two or more of them produces, according to the plan of such union, perfectly different compounds. Even Müller himself admits that there are characters by which "malignant" may be distinguished from "benignant" growths, but they are only appreciable by the naked eye or with a lens, and lost under the microscope. In fact, *in the present state of knowledge*, chemistry and micography would lead us into the error of confounding growths perfectly dissimilar in nature and effects. But the question is a clinical one; are individuals destroyed with the symptoms and manifestations of cancerous disease, in whose frame neither scirrhus, encephaloid, nor colloid are

case is one in which the destructive action overbalances the restorative." It will be perceived that according to Mr. Travers's definition the most innocent fibrous, cartilaginous, and lipomatous tumors, as well as the tubercles of phthisis, are all "malignant."

to be found? Never, we confidently affirm. Cystic and erectile formations sometimes apparently produce such effects; but when this has been the case, post-mortem examination discovers them to have been the seat of carcinomatous development.

Finally, the following proposition directly flows from numerous facts stated in the preceding pages: a cancerous tumor under all circumstances, even should it remain single and stationary for years, is but the local evidence of a general vitiation of the system. But, it may be inquired, is not this a contradiction—how is it possible that if the organism at large be in a state of disease, a single spot shall alone manifest its presence? We confess our inability to explain away this difficulty; but neither the fact of its existence nor its inexplicability shake the solidity of the opinion advocated. All pathologists, who have carefully investigated the history of the tuberculous affection, admit that local agencies, of whatever kind they may be, can never cause the production of a particle of tubercle—that constitutional derangement must lead the way. Now here we have precisely the same difficulty to contend with—a knot of tubercles may exist for years in the summit of a lung, and every other organ remain free to the last from the disease. Why this is so, we know not: these are the mysteries of pathology; and they are mysteries which it would, in the existing state of the science, be idle to attempt to penetrate.

From all that has been said we may deduce the following DEFINITION of cancer. Cancer is a disease anatomically characterized by the presence of scirrhus, encephaloid, or colloid, originating in a general vitiation of the economy, and possessing the properties of assimilation, of reproduction, and of destroying life by a peculiar cachexia.

PART II.—OF CANCER OF PARTICULAR PARTS.

I.—*The Skin.*

The skin, especially of some regions of the body, is exceedingly prone to phagedenic ulceration; and much uncertainty prevails among writers as to the precise relation such corroding ulcers bear to cancerous disease.

The condition of the skin preparatory to ulceration of this kind varies. 1. The most common change consists in the formation of an indurated excrescence, which exhibits on section, as was first shown by Scarpa, the characters of ordinary scirrhus. 2. The cutis is the seat of scirrhus infiltration. 3. Lesions which commence by ulceration induced by the continuous action of an irritating body, or of a particular virus (syphilis), acquire secondarily, in pre-disposed subjects, a basis of true scirrhus, and assume a phagedenic disposition. 4. Another class of ulcers neither originates in nor is accompanied with the formation of carcinomatous matter, but nevertheless possesses a corroding and intractable character. Now, in cases belonging to the three first categories, there is no difficulty in understanding why the ulterior progress of the disease should be that of cancerous affections: in the two first it is truly carcinomatous *ab initio*,^a in the third it eventually becomes so. If it were proved that those of the fourth possess the properties of such affections, that they are capable of producing special disorganization of the lymphatic glands, and contamination of the viscera, then there would be serious error in making the presence of encephaloid, scirrhus, or colloid, necessary to the existence of cancer; but this has never yet been done, and the sole cause of their having been ranged with cancerous diseases is, doubtless, their intractable, or so called, “malignant” character. Many simple syphilitic and scrofulous ulcers should, on the same plea, be pronounced cancers.

From the uncertainty referred to has arisen some difference of opinion respecting the true nature of the disease termed "chimney-sweepers' cancer." According to our views this affection may, or may not, be cancerous, and, in the latter case, may be so either primarily or secondarily; primarily, if it originate in true scirrhus infiltration or excrescence; secondarily, if the ulcer produced by simple irritation become the seat of scirrhus or encephaloid formation. Of the cancerous nature of the specimen, in which we discovered the following appearances immediately after excision, no doubt can be entertained. Four layers might be distinguished in the mass removed from the scrotum: 1. a stratum of firm laminar cellular membrane, presumed to be healthy; 2. the deep layer of the morbid structure, consisting of an indurated substance as resisting as fibro-cartilage, creaking like that tissue when the point of a scalpel was rubbed along its divided surface, and possessing a linear arrangement — the fibres being perpendicular to the base; 3. a stratum of much softer material, of yellowish white color, lobulated, and somewhat of a fungous aspect; 4. a viscid coating of ichor, of a brownish grey tint. These layers, more closely examined, presented the following characters. 1. With a common lens, a distinct partition of the cellular layer, by white opaque septa, enclosing yellowish and more transparent matter between them, was plainly discernible. Under a microscope of 150 powers, a particle of this putative normal tissue was found to consist of cells, some irregularly shaped, others pentagonal, and containing a distinct nucleus with nuclear corpuscles. A number of minute bodies, without internal cavity (granules of Müller) floated free; in one part, an elongated mass, with exactly the appearance of the fibrous matter of carcinoma fasciculatum (see Pl. I. fig. 8), presented itself; it had the transparent character of that pro-

duct.¹ 2. In the fibrous or linear part, caudate corpuscula, with or without nuclei and nuclear corpuscula, were abundantly seen, and presented the three varieties of arrangement shown in Pl. I. figs. 4, 5, 6. These were associated with cells of the description frequently referred to. 3. In this layer, a fibrillar stroma, of the kind represented in Pl. I. fig. 10, constituted a most remarkable feature. 4. In the ichor, we observed, in addition to nuclear cells, curved caudate corpuscules.

The most common seats of cutaneous cancer, as a primary disease, are the vicinity of the orifices of the mucous canals, the scalp, and the parts of generation; its characters are the same in all parts of the body.

The scirrhus excrescence or tubercle of the face may present the natural tint of the skin, or, as is more common, a reddish or dirty grayish hue, without any, or at least notable, thickening of the cuticle; and is indurated, firm and frequently rests upon a broad basis: varicose vessels in some instances ramify over the surface. It may exist in this state for a length of time, even for years, if unirritated, without being productive of inconvenience; in other cases it is the seat of constant pruritus, or burning heat from the outset. If excited, either by being scratched, or injured in shaving, or otherwise, the progress of these excrescences becomes more active — they increase in size,

¹ This shows distinctly that the germina of cancer (for here they probably extend much beyond the part examined, which almost presented the grosser characters of the disease,) are occasionally left behind in tissue, which appears at the time of operation, to be perfectly healthy. A remark of the same kind has been made by Gluge: "it is not only," he says, "in the encephaloid tissue itself, of affected organs, that its globules are found; they are also to be discerned in parts apparently healthy; for example, in portions of encephaloid lungs, which still retain the property of crepitating." (*L'Institut*, No. 191, Jan. 4, 1837.)

or, if the summit has been laid bare, a thin fluid exudes, which forms a scab; the latter is generally torn away, or drops off, and re-forms, while the ulcerative process advances underneath. An ulcer, at first superficial, but ultimately acquiring an excavated basis and elevated edges, exhibits itself; this eventually spreads in all directions, preceded in its progress by carcinomatous induration, and constitutes one of the conditions to which the term *noli me tangere* has been applied. Large fungous formations sprout upon its surface in some cases; the discharge is abundant always, but especially so under these circumstances, and copious hæmorrhage is not very uncommon. The vast destruction of parts, combined with the partial paralysis produced by the implication of filaments of the seventh pair, disfigures and deforms the countenance in a most striking manner. Even in this advanced stage of the disease it is not exceedingly uncommon to observe a temporary amelioration in its appearance, and a partial attempt at cicatrization, with formation of small florid granulations. In some instances, after excoriation has occurred, the surface of the excrescence becomes finely mammillated, acquiring the appearance of a mulberry (*moriform cancer*), and in this state it may remain for a long period before the establishment of destructive ulceration. When the affection originates in scirrhus induration of the cutis, it may likewise remain for years without exhibiting activity, until an abrasion or fissure occurs and a crust is produced; the course of the disease is henceforth the same as in the former case. It is not very rare for successive crusts to form without the separation of the more superficial having preceded. Large hard grayish concretions are thus formed, sometimes singularly elongated, and twisted like the horn of a ram; they present transverse sulci, corresponding to the number of layers successively deposited. These horny concretions may also form on the moriform variety. The ulterior progress of these cases is the same as of the former.

The constitutional symptoms are in general obscure until ulceration sets in; indeed, until the occurrence of this change, the health of the patient does not commonly suffer in any perceptible degree. They are, generally speaking, less marked than those arising from carcinoma of the external glandular organs.

M. Rayer confirms the statement of Scarpa respecting the scirrhus nature of the tissue of these excrescences. Incised lengthwise, and examined under a lens, says the former writer, they are seen to consist of a "lardaceous" tissue, traversed by whitish lines, and analogous in color to fibro-cartilages. If softened to any extent, a whitish matter may be pressed out of them, and they frequently contain true encephaloid substance. — The same pathologist describes some anatomical varieties of the disease. His *melanic* variety we believe to be the ordinary cancerous tissue tinged with black coloring matter. *Leucoid* cancer is distinguished by the milky white color of the excrescences; some of these are flat, and depressed in the centre; prominent at the edge, which is covered with vascular ramifications; others are rounded, and vascular in the centre, while their circumference is of a milky-white color. Under the magnifier they appear to be formed of hypertrophous chorion, infiltrated with a milky fluid. Like the melanic variety, they seem to indicate a cancerous diathesis. *Molusciform* cancer is distinguished by the flatness or slightly-rounded elevation of its tubercles in the centre; they are of the same color as the skin; their surface is wrinkled, and in the largest tubercles, the furrows are concentric. Their compotent tissue is true scirrhus. M. Rayer also describes encephaloid growths of the skin, but in the example given of this form of the disease, the morbid formation appears rather to have originated in the subcutaneous cellular membrane. This species of cancerous matter, how-

ever, as has already been mentioned, is sometimes produced in cutaneous nævi and erectile formations.

Cancerous disease of the skin may be distinguished from analogous affections, before and after ulceration, by the following circumstances, as pointed out by M. Rayer. 1. The tubercles of lupus, of Greek elephantiasis, and of certain forms of syphilis, are almost always indolent; those of cancer sooner or later become the seat of lancinating pain. Lupus exedens scarcely ever appears in persons past the prime of life; this is, on the contrary, precisely the period at which cutaneous cancer commonly originates. Phagedenic cancer commences by a single excrescence, in lupus exedens there are usually several — in lupus nonexedens there are almost invariably a considerable number. Cancerous ulceration is often attended with considerable swelling of the soft parts, and the neighboring vessels are dilated and varicose; these sores are besides made worse by the application of escharotics. When the nose is the part affected, the bones also suffer, and exhibit alterations characteristic of cancer; cancerous sores discharge plentifully, instead of being covered with thick dry scabs like those of lupus. The ulcers of lupus, of Greek elephantiasis, and of syphilis, do not occasion pain like those of cancer. But, as has been remarked by numerous observers, ulcers are occasionally met with which present many of the characteristics of cancerous sores, and are perhaps only distinguishable, clinically speaking, from these by the rapid recovery which sometimes follows the removal of a hitherto undiscovered cause of irritation. Common warts are characterized by the thickening of the cuticle which is almost always present, and by the cleft appearance of their surface; they never ulcerate spontaneously. Mollusciform cancer cannot well be distinguished from molluscum, unless when symptoms or other alterations of unequivocally cancerous character co-exist. An interesting example of the difficulty

which may arise in the diagnosis, has been published by Dr. A. T. Thompson.¹

The attempt to discuss cancerous excrescences is utterly vain. As a late testimony to the correctness of this statement, we may cite the fact, that M. Rayer, applied forty leeches round one small and recent cutaneous tubercle, without producing the smallest effect on it: the patient dying, the growth was found to contain encephaloid matter.

The true remedy is ablation, and the earlier it is performed the better. After the occurrence of ulceration, so long as the sore and its scirrhus basis remain superficial, excision may be practised, and is decidedly preferable to cauterization. When the disease has destroyed the tissues widely and deeply, extirpation with the knife is impossible; and all attempts to remove it with escharotics have no other effect than to add new virulence to the process of destruction. Under these circumstances we are reduced to palliative treatment².

II. *Subcutaneous Cellular Tissue.*

The subcutaneous cellular tissue of the trunk and extremities is one of the most common seats of encephaloid; but is rarely, if ever, observed to give primary origin to scirrhus. What has been said respecting the mode of growth, symptoms, termination, and treatment of encephaloid tumors generally is perfectly applicable to the disease in this situation. It will therefore be only necessary here briefly to recapitulate their characters.

For practical purposes it may be well to consider the progress of the diseased formation as divisible into three stages, which correspond with physiological changes in its substance. 1. The tumor varies in size when first detected by the patient, sometimes not exceeding, at this period,

¹ Lancet, Oct. 27, 1838, p. 177.

² Rayer, Diseases of the Skin, translated by Willis. Lond. 1835.

that of a pea¹ or of a marble; in other instances it attains much greater bulk before it excites attention. At this stage, though firm, it possesses a certain share of elasticity; it is movable, rather distinctly circumscribed, smooth and even on its surface, and of equal firmness in every part of its extent; the investing skin presents its natural thickness, suppleness, and elasticity; little, if any, pain, is complained of; the patient is sometimes even unconscious of the existence of the foreign growth, which may also be handled firmly without exciting uneasiness. 2. After a variable time the tumor begins to increase in size in a marked manner and sometimes with extraordinary rapidity; it loses its smooth and even surface, becomes irregularly lobulated, exhibiting in some parts considerable projection almost amounting to *pointing*, accompanied with a softness which conveys a sensation resembling that of fluctuation; while in other parts this is much less marked, and elsewhere the original firmness of the growth is still preserved. The skin, still movable on the surface of the tumor (which itself grows immovable from spreading among the muscles and subjacent parts), becomes evidently attenuated, in some cases to such a degree as to resemble mere cuticle, while it assumes a livid or yellowish red color, especially at the most prominent parts; the superficial veins enlarge. Severe pain, frequently of the lancinating kind, is commonly felt at this period, and the part is often exceedingly tender to the touch. Sometimes increase of temperature is observed on the surface, but this is to be taken as evidence probably of a sub-inflammatory state of the integuments. 3. The skin at length gives way at one or more prominent points, a thin serous fluid with more or less blood exudes from the openings, and fungous masses spring from these within a brief period—it may be a few hours—after perforation; the destruc-

¹ Wardrop, Travers, &c.

tion of the skin advances, and the phenomena which have led to the invention of the term fungus hæmatodes proceed in the manner already described.

It is important to remember that pain may be the first symptom; the patient is sometimes led to seek advice for this, before the least swelling is to be detected, in a situation where an encephaloid growth afterwards advances with rapidity.¹ The discovery of the tumor may or may not have been preceded by an impaired state of the general health.

The characters of encephaloid growths during the two latter stages are marked and peculiar; during the third an error of diagnosis is with ordinary attention impossible; during the second, unless some peculiar circumstances combine to mislead the observer, it is difficult to mistake the nature of the tumor; during the first—and the characters attributed to this may exist for some time after the new formation has acquired considerable bulk—no small difficulty is sometimes experienced in deciding on its nature: if it give rise to no constitutional suffering this difficulty may be insurmountable, until the ulterior progress of the affection shall have been watched: a fact which proves the necessity of caution in the prognosis of incipient tumors. The nature of the tumor being ascertained, its limits and original seat require to be made out. Careful examination both of the growth itself and of the adjoining vessels and nerves is essential for this purpose; the commemorative symptoms, also, will throw light on its original site, and the latter in turn clear up the question of its existing relations. If the disease originate under a fascia there is more than ordinary density and resistance. Encephaloid cancer, springing from the substance of the bones of a limb, “begins in general enlargement of the limb in the part opposite to the seat of the complaint and to a considerable

¹ Travers, *Op. cit.* vol. xvii. p. 394.

extent around it:" if in the subperiosteal cellular membrane "the general swelling of the limb is less, and the particular tumor more prominent" than when it has a truly osseous origin¹.

If the growth be situated in such manner as to admit of being completely excised along with a thick layer of sound tissue, this may be done; if not, the limb affected may be amputated; if seated where there is a doubt respecting its limits (as is often the case in the neck) and where amputation is inapplicable, instrumental interference of any kind will only hasten the patient's destruction.

III. *Muscles.*

Encephaloid tumors originate in the cellular membrane separating the fasciculi of muscular fibres, but they acquire no peculiarity from their situation, and follow the same course as subcutaneous growths.

IV. *Subcutaneous Glandular Parts.*

1. NON-SECRETING. (A.) *Lymphatic Glands.*—Primary carcinoma of the lymphatic glands, of most common occurrence in the groin, axilla, and neck, is generally of the scirrhus species. In the early stages it may be undistinguishable from chronic induration and hypertrophy; the inefficacy of treatment of any kind being in some instances the first circumstance which excites a suspicion of the nature of the case. After having been for a certain time smooth and even, the enlarged gland becomes knotty. The subsequent progress of the disease is that observed in scirrhus of the mamma, but ulceration is more slow to occur; and in many cases a sort of excoriation of the in-

¹ A. Cooper, Surg. Essays, Part i. p. 194.

vesting skin attended with ichorous discharge, and alternately healing and opening afresh continues for a length of time. Of this mode of progress of the disease an excellent example is contained in Mr. Travers' Essay (Op. cit. vol. xvii. p. 365.)

Encephaloid disease more rarely originates in these structures. One of the most remarkable cases of this kind on record, in which both the external and internal glands were affected, was observed by Dr. Carswell at the Hôpital St. Louis, and has been published by Dr. Hodgkin¹. The spleen and tonsils were the only other parts diseased in the same manner. A somewhat similar case is related by Mr. Wardrop (p. 157). These are decidedly unfavorable cases for operation.

(B.) *Thyroid Gland.* — Unless as a complication of pre-existing encysted disease or other form of bronchocele, cancer of the thyroid gland is singularly rare. Under the former circumstances scirrhus is the species in which the disease most commonly exhibits itself.

The case recorded by Velpeau, and already frequently alluded to, furnishes an excellent example of carcinoma of this structure, perfectly independent of adjoining cancer or of any preformed disease in the part itself. "The thyroid gland contained about a dozen cancers, all perfectly round, dense, elastic, and of a slightly yellowish white color. The section of these presented a bluish tint, and when cut into slices the transparence, characteristic of scirrhus tissue, became apparent. The largest of them equalled a pigeon's egg in size, the smallest was less than a pea in bulk. All of them were easily separated from the substance of the gland (which was itself perfectly healthy) and were simply in a state of contiguity with it²."

¹ Med. Chir. Trans. vol. xvii. p. 90.

² Cas Remarquable, &c. p. 40.

Scirrhus of the thyroid gland is distinguished, according to Bayle, from ordinary bronchocele by its greater hardness and more uniform consistence in all its parts. It rarely presents that regularity of form which goîtres almost always retain; if it be lobulated, its lobes are much less distinct than those of the latter disease. It may affect the entire gland or only one of its divisions.

The same observer acknowledges the impossibility of ascertaining with certainty, during the life of the patient, whether an indolent bronchocele does or does not contain some portions of scirrhus or encephaloid; but the absence of these diseased formations from other organs is a presumption against their existence in the thyroid gland.

[The removal of the thyroid gland in a scirrhus state may be effected either by ligature or by the knife. The latter method, though a dangerous one on account of the excessive bleeding likely to occur from the thyroid arteries, is less so in this than in many of the other tumors of the thyroid of greater size and vascularity. In two instances of this kind removed by Dr. Warren, at which we assisted, the disease was limited to a portion of the left lobe of the thyroid. In both of these cases either from the pressure of the tumor, or from anatomical deviation the inferior thyroid was wanting; the superior vessel was tied in one case, in the other it retracted, and it was found necessary to apply a ligature to the carotid in order to arrest the bleeding. If it should be determined to apply the ligature, the investments of the tumor must be dissected back; two double ligatures can then be passed at right angles to each other, under the base of the tumor, and the ends secured all round so as to produce complete strangulation of the mass. — W.]

(c.) *Thymus*. — The language of some of the older writers would lead us to suppose that carcinoma of the thymus is far from uncommon. Haller¹ affirms that this organ

¹ Opus. Pathol. Obs. 45.

“frequently becomes enlarged and affected with scirrhus, along with the conglobate glands;” that it “passes into a state of scirrhus, as he and others have seen¹.” Haugsted² justly concludes, that where no description is given of the affected parts, the accuracy of such phrases may be questioned: it is more than probable, indeed, that Haller simply meant to describe induration in using the term. Lieutaud³ is sometimes more precise in his description of the “scirrhous thymus,” and in these instances the affection appears to have been of tuberculous character. The characters of cancer of this organ — for though beyond doubt it can rarely, judging from the poverty of modern observations on the subject, be the seat of the disease, yet there is no reason to suppose it exempt from it — remain to be investigated.

2. SECRETING. (A.) *Mamma*. — Carcinoma of the breast either occurs as a tumor not intimately involving the tissue of the gland in its early stage, superimposed, as it were, on the surface of the organ and seated among the adipose matter investing it, in which case the adjoining cellular membrane often furnishes a very distinct pseudo-cyst: or the carcinomatous matter is infiltrated in the substance of the organ.

When occurring in the first and much the more common form, the disease commences by a small induration, rounded, circumscribed, rolling under the fingers, perhaps most frequently seated in the axillary portion of the gland, giving rise to no pain, and productive of no real inconvenience. As it advances in growth, the surface becomes irregular and knotted, the tumor loses its mobility from the spread of

¹ El. Physiol. t. iii. p. 119.

² Thymi in Homine ac per seriem Animalium, Descript. Anat. Pathol. et Physiol. Icon. 34, illustrat. Hafniæ, 1832.

³ Hist. Anat. Med. t. ii. pp. 118, 851, p. 90. Obs. 761, 763.

the disease to the tissue of the gland, the occurrence of engorgement in the cellular membrane, or the contraction of adhesions with the skin. At this period the characters of this form of the affection resemble those belonging to the infiltrated variety from its earliest development, as far as the substance of the mamma is concerned. In the infiltrated form the carcinomatous matter affects the glandular structure from the first, increases the weight, density, and size of the organ, and never constitutes a distinctly *superadded* tumor.

The morbid mass, which was at first sunk in the general adipose and cellular substance of the breast, gradually becomes prominent; the adhering skin, having first grown more shining and white than natural, acquires a reddish or livid color, generally mottled; the veins of the surface become enlarged and varicose; the nipple loses its prominence, and ends by sinking more or less deeply below the level of the surrounding skin, which is distinctly furrowed or puckered. The mechanism of this subsidence of the nipple differs in various cases: it may either depend on irregular adhesion of the mamma to the skin; on the traction exercised on the part by the obliterated and contracted galactophorous tubes; on atrophy of the proper structure of the gland; on thickening of the skin surrounding the nipple (here it is only apparent); or on carcinomatous infiltration of the latter part itself. In a variable point of the mass, sometimes before, but generally after certain evidences of internal softening in the tumor have occurred, the skin corresponding to the most elevated part undergoes the series of changes elsewhere described, and at last gives way. A serous fluid is at first discharged through the resulting fissure; the latter exhibits the characteristic progressive changes, ulceration spreads, soft or hard vegetations form on the ulcer, hæmorrhage and the usual phenomena of cancerous destruction succeed with greater or

less regularity and frequency. The affection of the lymphatic system follows here its usual course; the glands of the axillary and supra-clavicular regions suffer most considerably, and the obstruction to the circulation of the contents of the lymphatic vessels leads to extensive swelling of the hand, fore, and upper arm. This œdema may in advanced cases become of the hard kind with prominence of the cutaneous papillæ, and simulate a state of elephantiasis. It is sometimes complicated with frequent attacks of erysipelas, each of which permanently increases the size and hardness of the limb. This condition may form the chief source of suffering, and exercise all the endurance of the patient and ingenuity of the medical attendant. In these extreme cases M. Cruveilhier has discovered complete obliteration of the superficial and deep-seated veins of the axilla. The œdema may extend to the trunk and lower extremity.

The local symptoms present here no particular characters: yet the suffering is perhaps more than usually severe in this organ. The period of the first occurrence of pain is very variable; the patient is said to feel worse before each catamenial period, but this is far from being of uniform occurrence. The discharge of a small quantity of blood or serosanguineous fluid by the nipple is sometimes, as already noted, a symptom of early occurrence, and may be useful in a diagnostic point of view.

The cachexia commonly exhibits itself in an intense degree, and the patient, who has usually suffered from thoracic symptoms, such as cough, oppression, and dyspnoea, sinks at last, death being not uncommonly accelerated by inflammatory effusion into the pleura, or simple hydrothorax, accompanied with more or less pulmonary œdema, and with or without cancerous patches under the pleura¹. Aged subjects, who die from causes independent

¹ In a single case, related by Cruveilhier, the occurrence of pleu-

of their cancer, frequently go off in an attack of senile pneumonia; the latent character of inflammatory affections in old persons points to the necessity of ascertaining the physical state of the chest in such cancerous subjects, when the least suspicion of pectoral disease arises. According to Bayle, leucorrhœa of fetid character is a very uniform attendant on the closing stage, and does not necessarily depend on structural disease of the uterus; this is also true of the pain in the loins occasionally observed in the course of mammary cancer. Severe suffering is sometimes experienced in the back between the shoulders; this has been found by Sir A. Cooper to depend on carcinoma of the vertebræ. In a case of scirrhus of the breast observed by Sir B. Brodie sudden paralysis of the inferior extremities occurred two months before death. On post-mortem examination several of the dorsal vertebræ were found to have been converted into cancerous matter, and the lower portion of the theca vertebralis was filled with a serous fluid. The state of the spinal medulla, however, is not mentioned¹. In the majority of cases death occurs before the total destruction of the mamma; in others the ulcer extends from the axilla to the lower border of the pectoralis, while its basis is formed of the thickened pleura and ribs. These bones are sometimes cancerous, though the intervening muscles continue sound.

Scirrhus is incomparably the most frequent species of primary cancer in the breast. Encephaloid, however, sometimes occurs, either of the solanoid or true cerebriform varieties, or of both combined, the former forming the basis from which the latter springs; or the morbid growth

ris, acting like a counter-irritant, appears to have retarded the progress of the cancer, though it proved itself, eventually, the cause of death. Vide Livr. xxxi.

¹ On Dis. of Joints, Ed. 3. p. 283.

originates in the wall of a simple or multilocular cyst with fluid contents, and assumes a phylloid, pedunculated, or irregularly tuberiform shape. The latter is regarded by Mr. Travers "as the primitive form of medullary cancer, when it appears in the region of the mamma:" but this opinion is at variance with the experience of others. Colloid is occasionally witnessed in this situation; in the majority of instances forming part of a composite tumor.

Deposition of scirrhus in the infiltrated form may commence in either of the component tissues of the gland. M. Velpeau establishes three varieties of the disease, according to the tissue primarily affected. In the *ramose* variety the morbid action originates in the cellular laminæ dividing the lobes of the gland; an unequal, hard, ill-circumscribed tumor, which terminates insensibly in radiating indurated bands among the adjoining cellular membrane, is the result. In these cases it is almost impossible to assign accurate limits to the disease, as the bands in question extend sometimes even to the axilla or twist under the border of the pectoralis major; the importance of tracing them to their apparent termination in extirpating the disease has justly been insisted on by a number of writers. The true *glandular* variety (the *granulated* scirrhus of Mr. Travers?) commences by the lobules of the gland. Here the tumor is knotted, wrinkled on the surface, movable, tolerably well circumscribed, and firm. The form referred to by Mr. Travers is stated to occur most frequently at the axillary border of the organ, and may attain a large size, mainly because most commonly developed in full-breasted women. In the third variety, the *lactiferous ducts* are the chief seat of the disease. In four or five cases of this kind examined by M. Velpeau the tumor was flattened from before backwards, not very painful, half as large as an ostrich's egg, slightly tuberculated, and non-adherent. On section it was found to consist of ordinary

scirrhus, speckled with small spots like granite, and presenting a number of minute open orifices, filled with caseous matter. This appears to be Mr. Travers's *spiculated* scirrhus, which is seated "chiefly among the tubes and towards the nipple." It is hardly necessary to add, that with the progress of the disease these distinctions, founded on the tissue affected, are lost, as the entire structure becomes involved. Mr. Travers well remarks, that as such characters are not dependent on the nature of the disease, but the anatomical constitution of the organ, they may exist in other species of growth.

In some cases the course of the disease in respect of the skin is not such as we have represented it. This membrane appears occasionally to undergo the cancerous transformation coevally with, and as it were independently of, the subjacent tissues; or, as Mr. Travers, Bégin, Cruveilhier, and others have observed, the disease in rare instances actually commences with the skin. The natural suppleness, elasticity, and color of this tissue are lost, it acquires a dusky brownish hue and coriaceous hardness, becomes at a variable period studded with miliary pisiform scirrhous excrescences (most commonly of the leucoid and mollusciform varieties according to Rayer) which successively undergo superficial abrasion; these minute ulcerations extend, become continuous, and form a single wide-spread ulcer. This variety may commence in the nipple.

The *atrophous* and *hypertrophous* forms of scirrhous are both observed in the mamma. The former is most common in subjects of advanced age; its progress is usually slow. M. Cruveilhier relates a case showing the extreme degree to which the atrophy may advance; here the skin, cellular tissue, mamma, and a stratum of the pectoralis were converted into a stony mass only half an inch thick.

Cancer is very commonly confined to one breast, the left being somewhat the more frequent sufferer; in cases where

both organs are affected, the disease attacks one consecutively to the other; we do not recollect to have seen or read of an instance of the disease commencing in both simultaneously. Sometimes the two breasts are connected by indurated absorbents, or a chain of small cutaneous scirrhi.

The question of the causes of mammary cancer merges in that of the etiology of the disease in general. It is said to be more frequent in women who have not borne children, whether married or single, than in mothers, and its evolution connected with the disappearance of the catamenia: the former proposition requires stronger proof than has yet been given, before it becomes entitled to general confidence; of the latter we have already spoken.

Cancer of this organ is almost peculiar to the female sex: occasionally, however, it occurs in males, and appears in them to follow the same course as in women. It originates either in the nipple or its immediate vicinity. Mr. Travers relates the case of a wagoner, aged 58, in whom the disease, first perceived as a lump the size of a marble in the left breast, acquired in the course of three years the dimensions of a pullet's egg, and proved fatal (there was similar deposition in the lungs) in the course of forty months. Cruveilhier refers to a mammary tumor successfully removed from the breast of a carter aged 70.

[Cancerous disease occurring in the male breast so far as has been observed is of the scirrhus character. Dr. Warren has met with two cases, one of which, a gentleman 30 years old who had been operated on 12 years when the case was recorded, he describes as follows¹. "He had not enjoyed good health for three years, being dyspeptic. He had also frequent pains in the chest. These pains at last concentrated in the right side, near the nipple.

¹ Surg. Obs. on Tumors, page 282.

Passing his hand over this part he discovered a small tumor. The pains increased and became very severe within six months from the discovery of the tumor. The hardness extended around, involved, and drew in the skin giving it a puckered appearance. The skin ulcerated near the nipple, and discharged a foul matter. I excised the whole scirrhus mass, comprehending the skin with the nipple and the cellular substance to the pectoral muscle, about four inches in length and two in breadth. The wound of course was long in healing, but has since remained perfectly sound. A few months since I saw him, and ascertained that he was free from trouble at the affected part, and in perfect health." M. Velpeau has met with five cases. And he states that he has "never seen and neither do writers quote any examples of the dissemination of these tumors, or of their being reproduced in the viscera or other parts of the economy in men as in women." The case quoted above from Mr. Travers seems, however, to be a contradiction to this assertion. — W.]

We have no statistical documents to decide with precision the period of greatest frequency of the disease or the influence of age on its production. Although Mr. Carmichael has seen scirrhus of both mammæ in a child aged 12, and Everard Home relates an instance in which it commenced at the age of 15, its occurrence before thirty is extremely uncommon; persons of the most advanced age are not exempt from the chance of its development. Sir A. Cooper has seen it in an individual aged 86, and Cruveilhier maintains that such facts are of almost too frequent occurrence to be looked on as exceptional. Mammary encephaloid of the most acute character has been witnessed at the age of 82.

Scirrhus of the breast is, according to Sir A. Cooper, from two to three years in growth, and from six months to two years in destroying life after it has reached its acme.

When occurring in advanced age its progress is ordinarily slower: and to the remarkable exceptions sometimes met with we have already adverted. Mr. Travers and others affirm that the advance of the disease is retarded by uterogestation. Velpeau estimates the mean duration of encephaloid of this organ at from six to twelve months.

Although no single character suffices to distinguish a scirrhus tumor from certain other diseases to which the mamma is liable, yet a combination of the signs we have described will usually ensure tolerable certainty of diagnosis. If a hard, movable, indolent tumor, of small size, insensible under immediate pressure, but becoming painful a short while after manipulation, has existed in the breast of a female, aged thirty or upwards, for a certain period — say from six months to a year — the probability is strongly in favor of its being cancerous: this probability will amount to positive certainty, if either previously to, or at the end of, this period, lancinating pains alternating with perfect freedom from suffering supervene, and the disease resist local antiphlogistic and discutient measures. The state of the constitution will in general facilitate the diagnosis; but too much stress may very easily be laid on the absence of general disturbance. We have seen tumors, of which the truly scirrhus character was anatomically demonstrated, removed from women whose general health was excellent; and it has been remarked by a close observer, Bayle, that women sometimes become apparently even healthier than before during the incipient stage of mammary cancer. The signs of encephaloid growth in the breast, if combined in any number, can rarely mislead. The diseases with which the two species of cancer are here most likely to be confounded, are local or general hypertrophy or fibrous tumor in the case of scirrhus, and multilocular encysted formations in that of encephaloid.

The general principles we have laid down respecting the

prognosis and treatment of cancer, the propriety of and period fittest for operating, are strictly applicable to the disease in the breast. Enlargement of the axillary glands forms, according to Sir A. Cooper, Velpeau, and others, a positive contra-indication to the use of the knife: the fact of such enlargement diminishes seriously the chances of ultimate success, but general experience proves that what we have already said on this point applies to the mamma. The existence of retraction of the nipple diminishes still further the probable utility of extirpation, and the operation is inadmissible if there be active disease of the pleura or lungs. It is almost unnecessary to add, that the *ramose* variety is less favorable than the *tuberiform* or *glandular* for operation. Sir A. Cooper thinks that scirrhus does not return in one fourth of the cases of removal; Dr. Warren that one case in three is cured; Mr. Travers that permanent recovery "generally" ensues when the disease is removed before the supervention of pain: to the extreme and opposing opinions of Hill and Boyer we have already sufficiently referred. Among 98 amputations of the mamma performed by Benedict, two terminated fatally before the wound had closed; in 83 cases the disease returned after cicatrization, and proved fatal "more rapidly than if no operation had been done;" in 13 no relapse was heard of, but Benedict was morally persuaded that some of these cases were not truly scirrhus¹. The hopes of perfect and lasting restoration after the ablation of encephaloid are faint indeed; yet even here we need not wholly despair of success; M. Velpeau has excised well-marked specimens of this species, and seen the patients in perfect health two, four, six, and in one case ten years afterwards. When encephaloid grows from the walls of a simple or multilocular

¹ Rust's Magaz. b. 44, s. 191. 1835.

cyst containing serous fluid, the operation of puncturing the cyst and drawing off its contents accelerates the growth of the superadded cancer. The removal of pressure, as elsewhere explained, sufficiently accounts for the effect of such operation. Dupuytren in cases of this kind enucleated the cancerous masses, and stuffed the cyst with shredded lint to promote cohesion of its walls.

[The operation for the removal of the breast may be done as follows. The patient should be placed either in the sitting or recumbent posture, the latter generally being preferable when there are enlarged glands in the axilla, or the patient is likely to faint. The shoulders should be slightly raised, and the arm carried off from the body so as to stretch the skin and make tense the fibres of the pectoral muscle.

An incision should now be made of a semilunar form first below the tumor, then another of the same form above, —the direction of these incisions being either transverse, oblique, or perpendicular, according to the size, form, or position of the tumor —the dissection should be pursued either from above downwards or below upwards, and as much as possible in the direction of the fibres of the pectoral muscle, unless the muscle be implicated in the disease, in which case a portion of this and even of the bones of the ribs may be removed in preference to allowing any of the diseased mass to remain. Mr. Liston has advised that the dissection should first be made at the axillary side of the tumor, so as to avoid twice dividing the vessels, and also as saving much pain to the patient.

The diseased mass being removed, the next thing to be done is to secure the bleeding vessels, the larger of which present at the outer angle of the wound. If there be much oozing of blood after the principal vessels are tied, it may be well to wait an hour or two until all risk of hæmorrhage has passed before dressing the wound. If no danger of this kind be apprehended we may proceed at once

to apply the dressings. The lips of the wound are to be accurately adjusted by adhesive straps, and a slight compression made by a circular bandage round the body, or what is preferable and lately used by some surgeons is to bring the wound together by two or three sutures, and apply a simple cold water dressing. The latter method is by far the most comfortable to the patient, and the danger from erythema so often caused by the adhesive straps is thus avoided. 1123

When the skin has been removed so as to prevent the easy approximation of the edges of the wound, Mr. Lisfranc has suggested raising the integuments on either side, from the subjacent parts, for the space of an inch or more, which will generally allow of their being brought together; and M. Martinet de la Creuse has proposed the employment of the autoplasmic method to cover the large wound made in this way, and thus avoid the danger of the recurrence of the disease so likely to appear again where the cicatrix is extensive. — W.]

Œdema of the arm must be treated by position, and on general principles. When occurring in the extreme form spoken of, little of an effective kind can be done for its relief; M. Cruveilhier has in one such case had recourse, “with some advantage,” to leeches, blisters, and scarification: *melius remedium anceps quam nullum?*

(B.) *Salivary Glands*. — The salivary glands are rarely affected with scirrhus or encephaloid, and colloid cancer has not been observed in these organs. Of the numerous cases reported by writers as examples of cancerous disease, of the parotid for example, there are but few indeed in which it is not highly probable — in the majority this is certain — that the lymphatic glands of the neighborhood were the real seat of the morbid deposition. Tumors thus constituted press upon the parotid, and reduce it by gradual

absorption to a thin lamina, which is easily overlooked in the wound, resulting from their ablation.

Secondary scirrhus enlargement of the submaxillary and sublingual glands, however, is not of very uncommon occurrence in the course of, or after the removal of cancerous disease of the lip, adjoining skin, or tongue. It is certain, also, that scirrhus and encephaloid both occasionally originate in the parotid. The disease runs its ordinary course in this gland, nor is there any particular point to be noticed except the effects of implication of the fifth and seventh pairs of nerves. In a case observed by Magendie, "there was complete loss of sensibility in the corresponding side of the face, destruction of vision in the eye of that side, ulceration of the cornea, insensibility of the organ, not only to light, but under the contact of foreign bodies, deviation of the mouth to the opposite side, &c¹."

[The limits of this work will not allow of a detailed account of the surgical operations necessary for the removal of each of the salivary glands. The question of the possibility of the extirpation of the parotid may however be adverted to. The reason of the division of opinion among surgical writers as to the removal of this gland without the ligature of the carotid, may be referred to one of the following causes: 1. As stated above, from a removal having been effected of schirrous lymphatic glands placed over the parotid, or in the substance of this organ as remarked by Velpeau, causing an absorption of the gland itself. 2. From pressure of the schirrous mass causing obliteration of the principal vessels, explaining how in many of the cases recorded, the gland was removed without the necessity of tying the carotid artery. 3. As remarked by Dr. War-

¹ Lectures on the Blood, *Lancet*, Nov. 17, 1838.

ren, that the smaller, most vascular, and deep-seated lobe or pedicle of the gland, may sometimes escape the disease affecting the larger and anterior portion. If it be determined to proceed to the removal of the parotid, the danger will certainly be much lessened and the operation facilitated by the previous ligature of the carotid, either at its common trunk, or of the external branch, if the whole gland is not implicated in the disease. M. Mayor and some other surgeons have advised the use of the ligature in the place of extirpation by the knife, the investments of the tumor being first dissected up — an operation attended with much suffering, and great uncertainty of a complete eradication of the disease. As a result of these operations, we must almost always expect a partial paralysis of one side of the face, arising from a division of the facial nerve. This nerve therefore should be respected where disease of the whole gland does not require its division.

To the above operations may be added the ligature of the carotid, which by cutting off the supply of blood may either cause absorption of the mass, or arrest the progress of the disease, as in the cases already quoted of Dr. Hosack. — W.]

V. — ^A*Bones, Periosteum and Endosteum*¹.

(A.) BONES. — Cancer presents itself in the tuberos and infiltrated forms. The tuberiform variety occurs in the

¹ We take the liberty of proposing the word *endosteum* (formed on the model of endocardium) as a convenient substitute for the phrase, "lining or medullary membrane of the bones."

cancellated structure of the short and flat, and both in that constituent part and in the central cavity of the long, bones. The subjoined cuts exhibit its appearance in the body of the vertebræ, and in the spongy tissue of the head of the femur.

Fig. I.

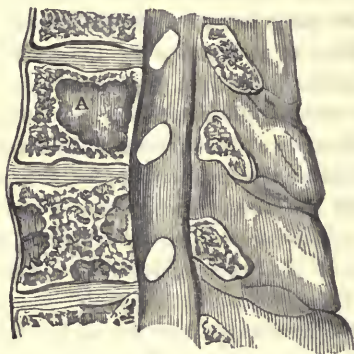
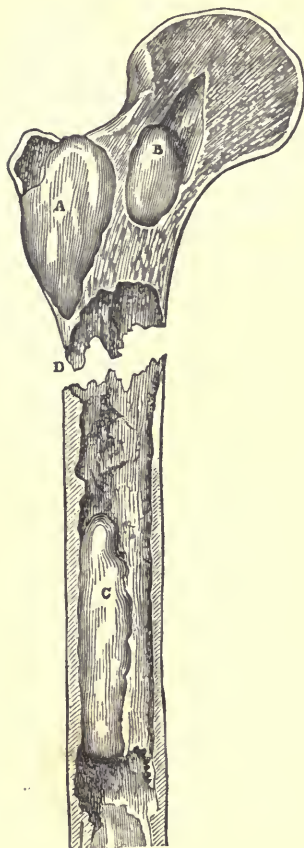


Fig. I. — A, Tuberiform scirrhus in the bodies of the vertebræ. The compact substance was destroyed in some of these situations.

Fig. II. — Femur fractured at D, the compact tissue having been worn to a thin lamina in that situation by a large tumor; A, B, C, carcinomatous tumors; m, the Medulla.

*Both these figures (copied from Cruvelhier's *Livrais.* xx.) were made from the bones of a subject affected with mammary cancer; her death had been accelerated by fracture of both femora.*

Fig. II.



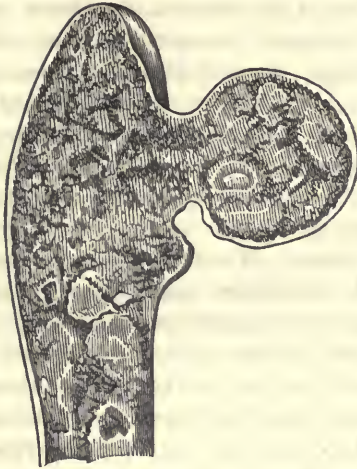
The compact substance, according to Cruveilhier, appears, so long as it retains its natural structure, insusceptible of becoming the seat of cancerous formation; but the facility of its transmutation into spongy tissue explains the occasional discovery of the morbid matter in the situation of the shell of the bones.

The shape of these growths is exceedingly various, but appears in the cylindrical bones to be somewhat influenced by the form of their central cavity. They are either of the scirrhus or encephaloid species; in the majority of cases, of the former. The firmness of scirrhus thus situated is ordinarily very considerable, and Cruveilhier considers it only distinguishable from fibrous tumor by its furnishing cancerous juice under pressure.

Tuberiform cancer, either primary or secondary in these structures, is most commonly of the latter kind. It appears to attend mammary cancer more frequently than others, though by no means exclusively—witness among many proofs of this an interesting example, related by M. Cruveilhier, of its development in the vertebræ and ribs of a subject who had had a testicle removed for encephaloid disease six months before death. Other instances of the kind will be referred to in subsequent pages. This form of cancer is not attended with abnormal development or expansion of the shell of the bones in which it originates; it resembles, on the contrary, the atrophous form of cancer in the soft parts, being commonly accompanied with molecular destruction, or absorption of the osseous tissue.

The general disposition of *encephaloid* matter *infiltrated* through the spongy tissue of the femur is shown in fig. III. The compact tissue is reduced to a lamina of extreme tenuity; the disease extended considerably further down the bone. For an example of pultaceous infiltration we refer to the section on cancer of the meninges (fig. IV).

Fig. III.



When carcinoma occurs in the bones, as a mere evidence of the diathesis being established in a person with primary cancer elsewhere, it rarely, if ever, acquires such magnitude as to cause external tumor; when the osseous tissue is the original nidus of the morbid matter, the case is different, and enlargement, visible externally, is produced in two distinct ways. 1. The disposition having occupied the entire of the cancellated structure, the investing shell may, as has been mentioned, be destroyed by preparatory conversion into spongy tissue and subsequent cancerous infiltration, — or absorbed from the pressure of the enclosed mass; in either case the morbid growth escapes under the periosteum, and then rapidly augments in size, while bony spiculæ sprout into its substance from the surface of the yet unabsorbed shell. (See fig. VII.) 2. Or the compact tissue may be immensely expanded, and form, as it were, a vast osseous sac, encasing the morbid formation, — in some parts of tolerable thickness; in others, reduced to a mere

parchment-like lamina ; in others, perforated from absorption : this is one of the diseased conditions to which the term "spina ventosa" has been applied. The articular cartilage investing the head of a bone thus expanded, was invariably free, in such cases as we have had an opportunity of examining, from cancerous infiltration ; though frequently in contact with the morbid matter deposited in the bones, the cartilage simply undergoes attenuation and elongation from the traction exercised on it by the expanding osseous tissue. We have elsewhere mentioned the opinion of M. Cruveilhier respecting the frequency with which this expansion depends on colloid cancer. We are, however, disposed to believe that true colloid is singularly rare in this situation, and that the affection thus designated, and of which numerous specimens are described by writers and preserved in museums, is really that recently termed *enchondroma* by Müller, and chemically characterized by containing a peculiar form of gelatine known as *chondrin*. The German author, indeed, (s. 44) dwells upon osseous expansion as one of the conditions distinguishing *enchondroma* from cancer. But that the latter, when of the encephaloid species, does occasionally produce this phenomenon, appears from the preparation No. 159, in the museum at St. Bartholomew's, as likewise from the testimony of Sir A. Cooper and Sir B. Brodie. The latter surgeon amputated the thigh of a boy aged fourteen, for a tumor eighteen inches in circumference — "this tumor was found to be wholly formed by an expansion of the head of the tibia : its upper and inner part was composed partly of cysts containing a bloody fluid, and partly of organized medullary substance¹."

(B.) PERIOSTEUM. — The periosteum, or more commonly, the cellular tissue uniting it to the bones, may be the sole

¹ On Dis. of Joints, p. 289, Ed. 3. 1834.

seat of cancerous disease. As an example of scirrhus originating in this site, the following case, by M. Cruveilhier, may be related. An inmate of the Salpêtrière, aged about fifty, observed a swelling at the upper part of the sternum two or three years after having had a cancerous breast removed. It gradually increased to the size of the fist, spread along the right clavicle, and eventually ulcerated in several points; meanwhile tumors, perceptible to the touch, formed in the liver. On post-mortem examination, the internal two-thirds of the clavicle were found very much enlarged, and of fusiform shape: the external third was slender. The tissue of the bone had a healthy aspect, being only corroded superficially, and the morbid formation limited to the periosteum: this membrane "formed a dense firm cylinder, of fibrous tissue, infiltrated with cancerous juice (scirrhus); the corresponding part of the medullary membrane was thickened, and, as it were infiltrated with serosity." (Chronic endosteitis?) The sternum was infiltrated with cancerous matter, and the disease had spread thence to the pectoralis major, and skin; reversing the more ordinary course of things, in which the affection of the skeleton is consecutive to that of the soft parts.

Periosteal cancer much more commonly exhibits the encephaloid character; and has been described by Sir A. Cooper under the title of "fungous periosteal exostosis." "The swelling," says this distinguished writer, "is lobulated; the greater part of it is composed of a white substance, somewhat elastic, but firm, and not so firm as common cartilage [hard encephaloid]; part of it is colored by blood, and the texture of this part is softer than the rest. When injected it shows a very unequal vascularity." The periosteum investing the mass is sometimes enormously thickened, and an abundant mass of bony spiculæ disposed in radiating lines, and continues sometimes with cartilaginous fibrils, is observed in the substance of the growth.

(c.) ENDOSTEUM. — In the majority of cases of cancer of the spongy tissue of the long bones, there is coexisting disease in the lining membrane of their cavity. Now, if Cruveilhier's opinions be correct, that the compact tissue does not ever, while retaining its characteristic properties, give origin to cancer, and that, as is believed by others also, carcinoma of the spongy tissue originates not in the osseous texture itself, but in the expansion of the central membrane lining these — the immediate seat of cancer in the bones is limited to the endosteum. But as these points are far from established, we have given a figure placing the possibility of distinct origin of the disease in the cylindrical portion of that membrane beyond a doubt. The growth C. in fig. II. furnishes sufficient evidence by its situation and form, that such may be the nidus of cancerous matter.

The disease may co-originate in the cancellated structure, central cavity, and periosteum of the same bone. It may be limited to a single bone, to a single region of the skeleton, or affect a considerable number of these in the same subject. The bones of the extremities, the ribs, vertebræ, clavicle, maxillæ, cranium, and pelvis, are all observed seats of the affection. Further illustration of this subject will be found in the following section.

VI. — *Meninges.*

(A.) CEREBRAL AND CRANIAL MENINGES. — It is unnecessary in a work of this kind to trace the successive steps by which pathologists have ascertained that the disease described by Louis under the title of "fungus of the dura mater," is of cancerous nature, and may originate in any of the following situations: — 1. Dura mater, (*a.* external laminæ, *b.* internal); 2, Pia mater; 3, Cerebral substance;

4, Cranial bones ; 5, Sub-pericranial cellular tissue¹. For an historical sketch of the subject we beg to refer the reader to the different productions quoted in the following pages, but especially to the elaborate volumes of the Wenzels, Ebermaier, and Chelius ; and shall content ourselves with laying before him a brief abstract of the present state of knowledge respecting it.

The errors of the older observers testify strongly to the *encephaloid* character of fungi of the dura mater : these tumors were in fact by early surgeons² in numerous instances mistaken, from the appearance of their constituent materials, for herniæ of the brain. The fact, however, now rests upon surer foundation : that perforating fungous tumors of the meninges are in the majority of cases composed of this tissue is now fully established by the combined testimony of the elder Siebold, Ebermaier, Graff, Schnieber, Otto, Wishart, Abercrombie, Schindler, Chelius, Cruveilhier, Velpeau, &c. But true *scirrhus* tumors also spring from the meninges and destroy the investing bony substance, as appears from M. Velpeau's *Cas remarquable* ; here a tumor of this description made its way partly through the occipital bone ; M. Cruveilhier's plates exhibit some examples of meningeal cancer belonging to this species, and others have been described by German investigators. Areolar pultaceous cancer has been found in the cranial bones.

Seat 1. Dura mater : (a.) External lamina, or surface.

¹ Cancerous tumors developed in some of these situations cannot, in strict arrangement, be referred to the head of meningeal growths—but as they are closely connected symptomatically and therefore practically with these, we have thought it advisable to consider them in the same place. Here might also be included encephaloid growths originating between the skin and the fascia of the scalp.

² A. Paré, Pauw, &c.

— Such is still believed by the generality of surgeons to be the sole seat of fungous growths exhibiting themselves in the form of a tumor on the exterior of the cranium. This opinion, originating with Louis, received the support of the Wenzels¹, but was strenuously combated by Walther and others on the evidence of some cases observed by themselves, in which the morbid matter distinctly sprang from other sources. Independently of those referred to or related by Louis and the Wenzels, there are several others on record proving that the external surface of the dura mater may be the nidus of these growths. Klein, for example, states that, in a case which he had an opportunity of treating, the tumor was detached without the least difficulty from the perforated bone, from which it appeared to be separated by a particular membrane, and was in organized connexion with the external surface of the dura mater alone. Wedemeyer observed a tumor growing from precisely the same seat, in respect of tissue, and protruding through the frontal bone. In the case of M. A. Bérard the deep surface of the dura mater was perfectly healthy, and the tumor, unconnected with the osseous tissue, extended laterally on each side of the perforation, separating the former from the latter. Mr. Travers and Mr. Mackenzie relate equally convincing cases. Richerand goes so far as to affirm that it is rare to open an old subject without finding heterologous tumors on the external surface of the dura mater: Boyer, with less inclination to exaggerate, contents himself with commenting on their frequency. In their incipient stage they form small grayish vegetations, are exceedingly firm, and of “lardaceous” aspect.

(b.) *Internal lamina or surface.* — The precise locality

¹ The Wenzels, however, admitted on the evidence of Sandifort's case and of another observed by themselves, that the disease may be developed in the cranial bones.

of cancerous growths developed in this situation is in all probability the cellular tissue connecting the dura mater and parietal arachnoid; and they are certainly of more common occurrence here than on the cranial surface of the former membrane. Why they should not so frequently come under the notice of the surgeon as the class just noticed will presently appear. Carcinomatous tumors of the serous surface of the dura mater have been observed by Gondanges, Baille, Hebreard, Meckel, Otto, Wishart, Ebermaier, Cruveilhier, and Velpeau. Chelius refers to six specimens of the disease contained in the Strasburg museum; and in one of his plates represents cancerous tumors co-originating on both surfaces of the fibrous membrane. Dr. Bright has also figured specimens of the disease in this situation, and shown, with Ebermaier and others, that the so-called glands of Pacchioni may give origin to it. The ordinary tendency of cancers developed in this situation is, as remarked by Otto and Cruveilhier, to grow inwards and depress the brain; under these circumstances they strictly belong to the department of medical pathology. But in comparatively rare instances they manifest an opposite disposition in respect of their growth, press on the skull, determine absorptive destruction of its substance, and protrude externally. In one case described by Cruveilhier, protrusion had actually occurred; in another perforation was in progress: one of the internal meningeal tumors discovered in the subject of Velpeau's *Cas remarquable* had partially perforated the occipital bone.

2. *Pia mater*. — A specimen of cancerous growth, originating either in the pia mater itself or in the cellular tissue uniting it to the arachnoid, is figured by Cruveilhier¹: although there was no perforation here, there can be no doubt that such effect might arise from the presence of a

¹ Livr. cit. Pl. 3, Fig. 3.

tumor in this situation, as sometimes happens when they are still more deeply seated. Dr. D. Munroe¹ long since described a tumor, evidently encephaloid, growing "on the brain," and which had perforated the frontal bone: J. Hunter refers to a perforating growth originating, as he believed, from the pia mater²: Mr. Mackenzie³ is of opinion that both descriptions refer to the same case.

3. *Brain*. — Ebermaier mentions two cases of cancer of the cerebral substance attended with absorption of the corresponding part of the cranium. In one of these the internal table and diploe of the right parietal had disappeared to a considerable extent, and the outer lamella was attenuated and even perforated. An encephaloid tumor weighing four ounces disclosed itself, on post-mortem examination, in the substance of the right hemisphere: the investing arachnoid and pia mater were in the normal state. That protrusion would have occurred here, had the patient lived longer, is rendered next to certain by a case subsequently watched by Ebermaier himself⁴. In this instance a fungous tumor, protruding from the cranium, and opened with caustic during life, was found to have taken its origin from the left hemisphere. Mr. Travers "has a preparation exhibiting a genuine example of encephaloid affecting the anterior lobe of the cerebrum and protruding the eye from its socket, while the eye itself was perfectly free from disease⁵."

4. *Bones*. — C. v. Siebold believing, on the authority of two cases he had met with, that the disease always originated in the diploe (an opinion which seems to have been that of Sandifort, Kaufmann, and Heister) termed it fungus

¹ Med. Trans. vol. ii. p. 353; Lond. 1772.

² On the Blood, vol. ii. p. 337; 1812.

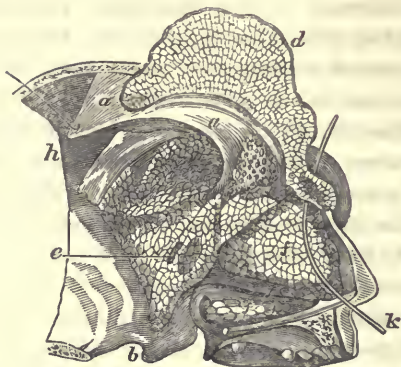
³ On Diseases of the Eye.

⁴ Article in Encycl. Wörterb. s. 581.

⁵ On Dis. of the Eye, 3rd ed. p. 228; 1824.

of the skull. But though the error of this notion, as an exclusive doctrine, is now thoroughly established, it is equally certain that these growths do frequently spring from the cranial substance. Passing over the cases just referred to, one of the tumors described by Wishart was evidently thus seated; the same may be said of Eck's case; a fungous mass, as large as an infant's head, observed by Schindler, grew from the tissue of the frontal and ethmoid bones. The chief connexions of an encephaloid growth described by Graff were with the diploe and compact substance of the bone; some trifling adhesions only brought it into organized relation with the dura mater and integuments. Velpeau refers to a most conclusive case, on the authority of Lauth of Strasburg, in which a tumor of fungous character had formed between the tables of the parietal bone. The diploe is commonly the immediate seat of the morbid formation in these cases; but Graff's case, as well as the admirable minute description by Ebermaier, of a cranial tumor, shows that the compact substance of the tables may be its nidus; whether with or without the transmutation of tissue described by Cruveilhier does not appear. The condition of the bones in the case of pultaceous alveolar cancer, related by the latter observer, is shown in the subjoined woodcut. Here the frontal, ethmoid, nasal, the body and wings of the sphenoid and the inferior turbinated bone, the pituitary membrane, and part of the dura mater were affected.

Fig. IV.



a, *Falx cerebri*; b, *foramen occipitale*; c, *chief substance of the tumor*; d, *surface of the os frontis*; e, *optic nerve*; f, *spongy bones*; g, *crista galli*; h, *parietal bone*; k, *sound passed through a fistula uniting the nares with the external surface*.

5. *Subpericranial cellular tissue*. — The chief tumor in Chelius's second case (that of a woman aged 58) was seated between the pericranium and bone, connected with the fibrous membrane at its line of union with the skull, and closely adherent to the osseous substance. The latter presented some small openings capable of admitting a sound, but no regular perforation. Chelius considers this growth a production from the pericranium itself; and his third case exhibits stronger evidence of the possibility of such origin. Blasius has also admitted, apparently however without having himself witnessed the fact, that the pericranium may be the primitive seat of the affection; but Ebermaier, in his latest production¹, questions the existence of pericranial fungus as a distinct formation. Chelius's cases seem at least to prove that cancerous growths may arise in

¹Article in *Encycl. Wörterb.*

the tissue intervening between the skull and its fibrous investment; and the fact is further established by a case observed by Mr. Langstaff many years back, wherein "a tumor was found at the vertex beneath the pericranium; it had affected the bone only in a slight degree¹."

V. Walther, on the evidence of a single case, maintained that the disease was always constituted by a simultaneous change in the dura mater, cranium, and pericranium, but especially marked in the blood-vessels of the diploe. In Chelius's third case, all those tissues were evidently, in some situations, included in the morbid change; and such, too, appears to have been the fact in the individual operated on by Sir A. Cooper. On the fallacy of V. Walther's notion, as a general proposition, it is needless to insist.

Symptoms.—It will be necessary to examine separately the symptoms of meningeal cancer while within the skull and after its appearance in the form of a tumor externally: with the signs and symptoms of the latter may be united (in order to avoid minute divisions) those produced from the outset by cranial and subpericranial cancer—care being taken to point out the more important peculiarities characteristic of the latter.

(a.) *Before perforation.*—Like intra-cranial tumors generally, meningeal cancer usually produces no symptoms in its early stage: the pressure undergone by the brain is attended with no interruption of its functions, either on account of the slow growth of the tumor, or of the cerebral atrophy which proceeds *pari passu* with the enlargement of the adventitious mass. At a variable period, however, according to a well-known peculiarity in cerebral pathology, the compression produces manifest effects, and these may occur so suddenly and assume such a character as to simulate the symptoms of an attack of cerebral hæmor-

¹ Med. Chir. Trans. vol. iii. p. 288. 1812.

rhage. Thus, sudden loss of senses, followed by hemiplegia, has been noted as an effect of intra-cranial cancer, or rather of the anatomical changes to which this gives rise; but in other cases—and these, fortunately for the facilities of diagnosis, would appear to be of much more common occurrence—the phenomena of compression arise gradually, the powers of feeling and mobility in the limbs diminish by almost imperceptible degrees and are finally lost, while the intellectual faculties undergo a chronic process of stultification merging in complete idiocy: in some instances the patient seems to be in a state of intellectual torpor only, and is capable of being roused into imperfect mental manifestation, as for instance, the returning monosyllabic answers to simple questions. In another class of cases the foreign body acts as an irritant, and produces some one of a variety of lesions announced by the supervention of severe pain and convulsive movements in the paralyzed limbs, or epileptiform attacks, occurring with greater or less frequency and violence. If these symptoms have been preceded by persistent cephalalgia in a fixed spot, the existence of intra-cranial tumor is rendered still more likely. The irritative changes thus produced—inflammation of the membranes, serous effusion under the cerebral arachnoid, or into the ventricles, common or capillary apoplexy, and white pultaceous or straw-colored gelatiniform softening of the surrounding brain—are stated by Cruveilhier to be the most ordinary immediate causes of death in these cases: the cancerous nature of the tumor rarely, if ever, leads to the fatal result.

But masses of fibrous, calcareous, or of tuberculous matter may give rise to a similar train of phenomena; the question arises whether there are any means whereby the cancerous nature of the growth may be distinguished. As M. Louis has proved that, with the rarest exceptions, the presence of tuberculous matter in any organ involves, in

subjects aged upwards of fifteen, its existence in the lungs, careful examination of the physical condition of those organs may lead to a determination of the nature of the cranial formation. If they are healthy, the latter cannot be tuberculous, if they are tuberculous, the chances are not only directly in favor of the intra-cranial tumor being composed of the same material, but against its being cancerous; for we have shown that the coexistence of carcinoma and tubercle in the same organism is extremely rare. But for the further consideration of these points we must refer the reader to works on medical pathology.

The seat of the tumor, admitting the fact of its existence to be established, is another problem of most difficult solution: the alleged locality of the cephalalgia is often a faithless guide¹; and a tumor confined to one side of the cranium may, from affecting both hemispheres, give rise to functional disturbance of both lateral divisions of the body.

When some particular sense is paralyzed, we have an

¹ M. A. Severinus (*De Med. Efficac.* lib. i. part. 2. cap. 3.) refers to the case of a Spanish nobleman afflicted with violent headache which had resisted every kind of treatment; the sufferer consented to the application of the trepan over the seat of the pain. The operation brought into view a fungous excrescence, the destruction of which cured the cephalalgia permanently. But these bold proceedings have not always been crowned with similar success. Mr. S. Cooper "saw Mr. Ramsden trepan a man for a mere fixed pain in one part of the head, on the supposition that there was a tumor under the bone; but no tumor was found, and the operation caused inflammation of the dura mater and proved fatal." The subject of Lauth's case, to which allusion has already been made, had been trepanned before death in the situation of an obstinate local headache with which he had been tormented: the cancerous growth was discovered in the diametrically opposite part of the skull. On the other hand Wepfer relates an example of successful issue in a case like that of Severinus. (*Obs. Med. Pract. De affect. Cap.* Obs. 48. p. 119.)

aid in localizing the disease; yet over-confidence in the positive or negative information thus obtainable may easily betray us into error. Professor Bérard¹ has related a case in which the olfactory nerves were destroyed by the pressure of a tumor, and yet the patient, according to the positive affirmation of the occupants of the beds adjoining his, enjoyed to the last the faculty of smell. Although not established with sufficient certainty to obviate all skepticism as to the reality of its occurrence, this fact was seized with avidity by M. Magendie as a triumphant argument for his doctrine of the functions of the fifth pair of nerves. In Graff's case there was a peculiar sensation of cold experienced in the throat and stomach, so that the hottest food seemed iced: a tumor was detected pressing on the medulla oblongata, the glossopharyngeal and vagus nerves. In a case of intra-cranial carcinoma destroying the trunk of the fifth nerve, and related by Mr. Bishop², a variety of symptoms, depending upon the lesion of that important trunk, arose, and might unquestionably have furnished materials for localization of the disease.

When opportunities occur for making a post-mortem examination, in this stage of their progress, of tumors originating from the internal surface of the dura mater, these productions are in almost every instance found non-adherent to the substance of the brain; in some cases there is no adhesion visible between the cerebral and parietal arachnoid; in others these layers and the pia mater are firmly united, or false membranes present themselves in the cavity of the serous sac³. Some one or more of the

¹ Thèses de Paris, No. 23, 1826.

² Med. Gaz. vol. xvii. p. 387. 1836.

³ Unless as a consequence of the presence of a tumor, such lesions of the arachnoid are scarcely ever met with. M. Louis (Rech. sur le Gastro-Entérite, t. i. p. 382. 1829,) examined the brains of 500 subjects without discovering one example of cellular adhesion of that membrane.

changes already referred to are discovered in the brain, when irritation of that viscus has been the immediate cause of death.

But when, instead of growing inwards, cancer of the *internal* surface of the dura mater presses forcibly on the cranial substance, absorption and perforation, as we have already mentioned, follow. The characters of the protruding mass and of the perforation deserve notice. In one of Cruveilhier's cases, in which a distinct elevation was discovered under the scalp, (but not till after the patient's death,) this was found to form a spongy mass, consisting of a dense fibrous lamina, and a multitude of osseous vegetations mingled with softened matter. The skull was widely perforated; the internal table destroyed and replaced by encephaloid pulp to a considerable extent round the opening, the external forming a thin elastic scale within the same limits. Here the cancerous nature of the malady might almost be predicated with certainty, if the fact of perforation were established; but the protrusion might easily be mistaken for a fungus from the *external* surface of the dura mater—an error committed in the very instance referred to. We are not aware of any means by which the distinction could be made in the living subject: the mode of destruction of the bone is in both instances subject to the same variation. The cranial substance may either soften from carcinomatous infiltration; the internal table and diploe may alone be destroyed; or in addition the external may be rarefied and cribriform from numerous minute perforations; or, as is the most common case, gradual absorption is effected in the same manner as in the case of postosseous aneurism. From the direction and manner in which the opening is formed, it naturally follows that this should be much narrower externally than internally, the tables of the bone appearing bevelled off from without inwards. (See Fig. V.) The edge of the outer table is

usually thin, sharp, and uneven. While the process of destruction goes forward, rugged and irregular spiculated

Fig. V.



Fig. V.—Internal view of the cranial bones perforated by an encephaloid growth springing from the internal surface of the dura mater; a, bony detritus and cancerous matter adhering in part to the external surface of dura mater; b, perforation. The bevelling of the substance of the cranium round the perforation is distinctly shown.

bony vegetations, as shown in Fig. VI, sometimes form on the external surface of the cranium. However compact the bony tissue may be, it is incapable of resisting this perforative process. M. Velpeau quotes the Thesis of M. Thibault¹ as supplying cases in which cancerous growths forced their way through the petrous process into the meatus externus. In cases where the walls of the nares have been perforated, epistaxis has almost constantly been noted.

¹ No. 133, Paris, 1816.

Fig. VI.



Fig. VI. — External view of the same. a, a, Parietal bones; b, frontal ditto; c, osseous spiculæ; d, perforation. (After Cruveilhier.

(b.) *After perforation.* — The cancerous formation having thus overcome the firmest obstacle in its way, protrudes through the adventitious foramen in the form of a fungous tumor. This tumor may possess one or more of several characters, which, if combined in any number, are pathognomonic of its nature. It presents the lobular surface, the soft elasticity and hardness of encephaloid; it is immovable, yet non-adherent to the skin, which itself retains its natural appearance. In point of size the tumor varies exceedingly — at an early period hardly so large as a nut, it may eventually acquire, as in Grima's case (Louis), the dimensions of "a second head." When the protruding mass does not bulge out far beyond the edge of the perforation, the irregular borders of the latter may sometimes be distinctly traced. It is the seat of two kinds of pulsation —

one of these synchronous with the arterial pulse; the other corresponding to the rise and fall of the brain accompanying expiration and inspiration. The tumor may be pushed within the cranium either wholly or in part, a change in its position giving rise to symptoms of cerebral compression: when left to itself it recovers its previous appearance and size. It is usually indolent under pressure, but is frequently the seat of darting pain: Louis, the Wenzels, and Boyer, suppose this produced by the sharp edge of the bone, and state that it may be relieved by *gentle* pressure.

As the size of the tumor augments, the skin becomes tense, discoloured, and thin, and finally opens; the fungous growth protrudes, and the usual phenomena of such ulcers are exhibited. Death has, however, usually occurred before the disease had reached this stage. Before the protrusion of the fungus a peculiar crepitus is heard on pressing the attenuated bone covering it; this sensation is afterwards perceived within the limits of the destruction of the tables and diploe. The appearance of the tumor on the exterior of the skull is sometimes sudden, and may be accompanied as in Robin's case (Louis), with severe symptoms—vomiting, hiccup, small pulse, and cold extremities.

But almost all these symptoms may be absent. According to Velpeau the expiratory elevation will be nearly always wanting, if the dura mater possess its natural powers of resistance, if the tumor does not protrude internally, if it traverse a thick bone, if it is not broad-based, or if it be tightly compressed between the dura mater and the integuments. Chelius's first case shows that the growth may be easily reducible and yet unaffected by the respiratory movements. Whether the arterial motion depend on transmission of the cerebral vascular pulsation or on intrinsic pulsation is undetermined; but it may be absent altogether. It must not be confounded with the individual beating of vessels ramifying on the surface. If the mass communicate

with the interior of the skull by a narrow pedicle, it is irreducible: adhesions and thickening of the dura mater will sometimes produce a similar effect. Under these circumstances pressure on the tumor produces no effect on the cerebral functions: this is easily intelligible. But Espinosa reports a case from the practice of Dupuytren in which almost complete reduction of the tumor within the skull produced none of the symptoms of compression; and in Chellius's first case a similar peculiarity was noticed.

In Ebermaier's case of fungus sprouting from the substance of the *brain* the disease first presented itself externally as a painful doughy tumor, about half as large as a walnut: at a later period the protruding growth could be pushed into the cranium without producing any apoplectic symptoms; a motion distinctly corresponding to the expiratory elevation of the brain existed in the tumor. The case was attended with various symptoms of cerebral disease, and terminated fatally about a year after the occurrence of protrusion.

The following is Ebermaier's description of the course and symptoms of the disease when originating in the substance of the *cranium*. Without appreciable cause either local or general in the majority of cases, sometimes, however, in consequence of a cachexia [diathesis], at others of local injury, without pain, cerebral symptom or inflammation of any kind, a hard, accurately circumscribed, immovable tumor, non-adherent to the skin, is developed in a variable point of the skull, causes no inconvenience for a length of time but does not yield to treatment: it has all the characters of an exostosis. The whole mass continues to grow, containing as its nucleus a sort of skeleton of osseous lamellæ prolonged into fibrous cellular tissue, between which encephaloid matter accumulates; these lamellæ sometimes produce an appearance resembling that of the sea-hedgehog, as is seen in fig. VII.

Fig. VII.



The tumor remains without change until death, circumscribed, solid, immovable; there is no trace of osseous edge at its base—the cranial bones appear on the contrary continuous with it. Here there is no pulsatile movement; there is no aperture felt in the skull, the tumor cannot be reduced, nor does pressure on it affect the cerebral functions in the smallest degree. The disease from which this description is drawn up terminated fatally in eight months after its first appearance. Cruveilhier's case of cranial colloid was of much longer duration, and was in all probability cut short by an injudicious operation.

When the morbid production forms in the *sub-pericranial cellular tissue*, it will neither present any respiratory movement, nor give rise to cerebral symptoms when pressed on, and will of course be irreducible.

If the disease originate simultaneously in the sub-pericranial cellular tissue and on the external surface of the dura mater, the bone becomes affected by extension of the morbid change to both its tables: the diploe is last affected. When the destruction of the bone is complete, pulsation may be distinguished, as in cases of ordinary perforating fungus of the dura mater. (Chelius.)

Carcinomatous tumors presenting themselves on the surface of the skull, are liable to be mistaken for encephalocoele, erectile tumors, aneurism, common encysted tumors of the scalp, abscess, and cephalhæmatoma. *Encephalocoele* is accompanied with both kinds of pulsation adverted to: but, unless the result of accident, it is almost peculiar to new-born infants, and the facility of reduction, together with the relief following such reduction (unless pressure be too forcibly made), will generally distinguish it from perforating cancer. It is more frequently pedunculated than cancerous growths, and, unlike encephaloid, is of equable consistence in its entire extent.—*Erectile tumors* rarely attain any large size without affecting the condition of the skin, and their pulsation may, in general, be diminished, or even stopped, by exact pressure of the external carotid. (Espinosa, Velpeau.) Similar pressure, however, would appear to produce a like effect on protruding cancer; the pulsation of the fungus situated over the ear, observed by Orioli, was stopped by pressure on the temporal artery. Erectile tumors are more under the influence of the general circulation than fungous growths, swelling under all states of undue excitement of the heart's action; they may be, as in the remarkable case of cranial disease, figured in Cruveilhier's 33rd Fasciculus, the seat of a strong *bruit de soufflet*,—at least, when this pervades the entire arterial system.—In one of the cases related by Louis, and in Orioli's case, the affection was mistaken for an *aneurism* of the scalp; the presence of a strong bellows-sound, the absence of opening in the cranium, and the effects of pressure of the trunks of the scalp, coupled with careful investigation of the commemorative signs, will prevent this error; but we should have thought it almost impossible to avoid mistaking a perforating aneurism of the middle meningeal artery for a fungous growth, were it not that the very different and

less excusable error of confounding this affection with an encysted tumor has actually been committed¹.—*Encysted tumors* are distinguished by their mobility; *abscess*, by the presence of signs of inflammatory action, and by the mode of formation of the swelling to which it gives rise.—If occurring in a new-born infant, the disease is liable to be confounded with *cephalhæmatoma*; but fungus of the surface of the skull is so extremely rare at this age, that such error is little to be apprehended. There are, we believe, but two facts mentioned by writers, which prove that perforating cancer has ever presented itself in new-born infants; one of these is the case related by Schnieber: the other the existence, in the Strasburg Museum², of a congenital spongy tumor, originating from the outer surface of the dura mater, and protruding through the skull.

When occurring in particular situations it seems next to impossible to avoid error as to the nature of meningeal cancer. Where the tumor forces its way into the orbit and dislocates the eye, as in cases by J. L. Petit³, by Mr. Travers⁴, and by Mr. Mackenzie⁵, it assumes all the characters of orbital cancer. In Professor Bérard's case of destruction of the olfactory nerves already mentioned, and in another instance figured by Cruveilhier (Livr. viii. pl. 3), the tumor protruded through the ethmoid bone into the nares; the similarity to a cancerous nasal polypus might easily have deceived even a practised surgeon; M. Velpeau observed a case in which the tumor first appearing at the inner canthus, soft, fluctuating, without discoloration of the skin or pain, simulated a lachrymal tumor, and afterwards an

¹ See ANEURISM, Cycl. Pract. Surg. p. 264.

² Vid. Kilian, Anat. Untersuchungen, über das neunte Hirnnervenpaar, s. 127. Pesth, 1822.

³ Traite des Maladies des Os: t. ii. p. 325.

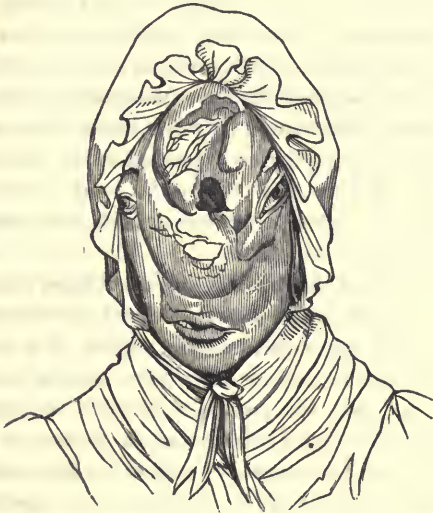
⁴ Diseases of the Eye, p. 411.

⁵ Diseases of the Eye, p. 80. ed. 1839.

orbito-nasal cancer, depressing the eye and protruding into the nares. A similar instance is described by Louis in which the tumor made its way through the os unguis.

The curious deformities of visage produced by some of these growths are well exemplified in fig. VIII.

Fig. VIII.



The tumor here measured 10 inches 2 lines in length, 5 inches and 2 lines from one eye to the other, and 4 inches and 2 lines in depth, at the deepest part. The greater part of the frontal and of the nasal bones was destroyed; even the hard palate had given way, so that the tumor protruded into the buccal cavity, and obscure fluctuation was there perceptible. The patient suffered from diplopia. No autopsy was permitted: Chelius considers the case an example of coexisting disease of the pericranium, dura mater, and bones; there are several circumstances in the history, making it not improbable, we think, that it sprung from the frontal sinuses. The effects of an attempted operation on this tumor are related further on. (From Chelius.)

We have already described the ordinary mode of death in cases of internal meningeal cancer; the description will, in the majority of cases, apply to the protruding species, which rarely destroys the patient with the ordinary phenomena of external carcinomatous disease. A table is given further on which shows, that in twenty-one at least of the cases on record, the cerebral symptoms preceding death were brought on by various operations, or attempts at operations, on the tumors. According to Velpeau, when these patients perish rapidly, the dura mater or surface of the brain is found inflamed, covered with pus, ulcerated, softened, or reduced to a putrid detritus: in other cases there is purulent infiltration of the arachnoid, extending to the occipital foramen, with apoplectic effusion into the brain. Among sixty cases Velpeau only detected three in which there was co-existing cancer in other organs.

The duration of the disease differs extremely in different instances. Graff's patient had suffered thirty-seven years at the time of her death; Louis speaks of a case which lasted forty years; others have been known to exist for thirty, fifteen, and ten: but its ordinary course is much more rapid. The slow course of the disease in the cases referred to, may, on first view, appear an argument against its cancerous nature, but Graff's narrative is precisely one of those which, by their precision and minuteness, place the encephaloid character of the malady beyond the reach of controversy.

The seat of these cancers, in respect of the region of the skull affected, was as follows, in 51 cases analyzed by Velpeau:

- 13 in the parietal region,
- 8 — temporal —
- 7 — frontal —
- 7 — orbito-nasal —
- 7 in the occipital region

- 5 — vertical —
3 on the petrous bone,
1 in the substance of the falx cerebri.

Tumors of the internal surface of the dura mater, in particular, have been most frequently met with by Cruveilhier at the angle of union of the falx cerebri with the rest of the membrane, when seated at the convexity of the skull; in the olfactory groves, the sella turcica and the surfaces of the petrous process, when occupying the base.

The number of tumors existing in one skull varies. It appears from M. Velpeau's inquiries that they are commonly single, as had been already affirmed by Meckel; twelve examples only of multiple development presented themselves in sixty cases. They are sometimes very numerous; Sandifort found eighteen, Ritterich fourteen in one subject, and cases almost similar have been observed by others. Cruveilhier¹ speaks of having discovered one hundred in the diploe of a subject with mammary cancer.

Of the causes of the disease nothing is known: numerous writers gratify their fondness for universal explanation by ascribing it to blows; but they fail to adduce a particle of evidence proving that the disease had not existed before the receipt of the injury; this appears, however, in some cases, to have hastened the occurrence of protrusion. Abernethy, true to his general doctrine, conjectures that an effusion of blood from a blow might become organized, and form a fungus; but he had not himself observed any facts in support of such a view². Were this notion established, the influence of external injury would be clearly defined. Some attribute the affection to the venereal cachexia: others (such as V. Walther, who looks on it as identical with the white swellings of joints,) to the scrofu-

¹ Livrais. xx. Os. p. 4.

² Surg. Observ. on Injur. of the Head, p. 58. Ed. 1826.

lous: both opinions, merely hypothetical at the best, are disproved by observation. — The affection has been met with in the two sexes with about equal frequency; twenty-three of the subjects of forty-four cases, collected from different sources by Velpeau, were males, twenty-one females. It is observed at every age, as the following table of forty cases, by the same writer fully shows:

From <i>Æt.</i>	0 to 10	6 cases,
—	20 — 30	7 —
—	30 — 40	10 —
—	40 — 50	9 —
—	50 — 60	5 —
—	60 — 80	3 —

TREATMENT. — Upon the inutility of resolvents, and local applications of all kinds, it is unnecessary to dwell.

Compression originally, as we believe, employed from the disease being mistaken for encephalocele, and apparently warranted by the result of a curious case related by Louis (the benefit derived really depending on the reduction of the tumor), is justly rejected wholly by modern practitioners.

The destruction of the tumor has been attempted in many instances by opening it with caustic. Five out of six cases treated in this way, and collected by Ebermaier, terminated fatally, almost immediately: in the case with successful issue, related by Eck, doubts are thrown out by Velpeau, whether the disease was really cancerous.

Ficker describes an example of apparently successful ligature; Velpeau questions the carcinomatous nature of the disease in this instance also. In other cases constriction with a ligature has been followed by convulsions; Mr. S. Cooper mentions his having observed the fatal effects of this mode of operation exemplified at St. Bartholomew's.

In order to place in the very strongest light, the disastrous consequences to be expected from merely incising

these tumors, or from a partial attempt at their removal, we subjoin the results of a number of instances in which such measures were had recourse to.

REFERENCE.	OPERATION.	RESULT.
AMATUS LUSITANUS. (Centur. 5. Obs. 8.)	Incision.	Death in convulsions two days after.
CAMERARIUS.	Opening with caustic.	Death on third day.
AMBROISE PARE. (Louis, p. 10.)	Opened for an abscess by a barber.	Death on second day.
PETIT. (Louis, p. 13.)	Opening with caustic potass.	Death a few days after.
SIVERT. (Louis, p. 14.)	Incision.	Draining hæmorrhage, death on second day.
REY. (Louis, p. 21.)	Tumor incised crucially.	Stupor after operation, continuing until death, on 5th day.
LEGRAND. (Louis, p. 23.)	Caustic applied	Convulsions and death on 8th day.
CHOPPART. (Louis, p. 31.)	Central incision.	Death in less than 24 hours, without convulsions or pain. (Infant æt. 2.)
SALTZMANN. (Louis, p. 34.)	Partial removal of tumor.	Death on 11th day.
VOLPRECHT. (Louis, p. 36.)	Incision of skin and pericranium; one-third of the bony circle, but none of the morbid growth removed.	Lingering death, with cerebral symptoms.
PHILIPPE. (Louis, p. 43.)	Tumor incised.	Death a few (6 or 8) hours after; slight delirium and convulsions.
HEISTER. (In Kaufmann.)	Opened with caustic.	Hæmorrhage, — convulsions, — death in about 24 hours.
V. WALTHER.	Incision of base, hæmorrhage, and ligation of 10 arteries; 2 lbs. of blood lost.	Cicatrization; patient alive two years after; the tumor only slightly enlarged.
SIEBOLD.	Attempted removal.	Death under knife, from hæmorrhage & convulsions.

REFERENCE.	OPERATION.	RESULT.
SIEBOLD.	Incision from one end to the other of the tumor.	Death on the 4th day.
ASTLEY COOPER.	Tumor partially removed.	Fever; coma on the 4th, death on 6th day.
KLEIN.	Tumor punctured with a trocar, and 4 ounces of blood drawn off; then incised in its entire length.	Death on the 4th day.
SCHNIEBER.	New-born infant: tumor removed by the father with a razor, as close as possible to the base. Again removed to the level of the bone; the patient ætat. 5.	Gradually reappeared without affecting the child's health. The fungus reappeared, and was as large as before on the 11th day: death on the 15th.
GRAFF.	Removal to level of skull	Patient lived 6½ mos., when the tumor had re-acquired its original size.
WISHART.	Crucial opening made.	Fungous growth sprouted out in 3 days; death on the 14th.
TRAVERS.	Tumor incised for an abscess.	Free hæmorrhage; "death quickly followed."
CHELIUS. Case 4. (vide fig. 169.)	On first incision, tremendous hæmorrhage; a large part excised; obstinate bleeding. (April, 1826.)	Wound almost closed six weeks after; but tumor then larger than before operation; pulsatile, painful, and the seat of frequent hæmorrhage. — Death December, 1827.
AMUSSAT. (Cruveilhier's case of cranial colloid.)	Partial extirpation.	Reproduction; death in one year.
JOBERT.	Removal to level of skull; actual cautery applied to the bone.	Disease returned in a month. (Case afterwards operated on by Bérard, jun.)
ORIOLE.	Imperfect removal.	Rest removed by gangrene; recovery.

There can be little question in the mind of any one, after a perusal of these columns, as to the fitness or unfitness of incising, applying caustic to, or partially removing these tumors. If any operation be admissible it is evidently the complete ablation, and this only, of the diseased growth. And if we look to past experience for facts justifying such extirpation, we shall find few to encourage us in pursuing or recommending the practice, or to authorize the surgeon in regarding the affection otherwise than with Ebermaier, as a *noli me tangere*. The successful issue in the cases of Severinus and Wepfer must be looked on as a fortunate chance; of the only two operations, as we believe, performed of late years — those by Bérard and Orioli — the latter, it is true, terminated successfully, the other fatally in 34 hours. The operation, however, can neither claim the honor of the recovery in the one case, for this was the accidental effect of gangrene attacking a portion of the tumor which the operator had been unable to reach; nor can the propriety of operating in general be denied on the score of the disastrous issue of the latter, for from the size of the tumor — sixteen applications of the trepan, an interval of one or two lines being left between each pair of circles besides, were required — the case was unusually unfavorable for operation. As to the opinions of writers on the point, we find Boyer recommending extirpation in but a very few cases; Delpech rejecting it altogether; Richerand advising it only when the growth is seated at the upper part of the head. Velpeau confining it to tumors with a narrow base and which only require removal of the bone without implication of the dura mater. There can be no doubt of the theoretical propriety of the last opinion, and in the instances of sub-pericranial and cranial cancer it may be carried out in practice, as it is not impossible to distinguish these from the more deeply seated forms. But we have

already stated that there is no diagnostic mark whereby fungous protrusions growing from the internal surface of the dura mater or deeper parts may be distinguished from those springing from the external surface of the former texture. If, however, upon removing the surrounding bone the operator should discover that the deep surface of the dura, or even the pia mater were involved, Cruveilhier and Velpeau both agree in the propriety of removing these membranes; in fact, where the operation has advanced so far, there seems no other course left to be adopted.

If the operation be determined on, the investing skin should be divided by a conical incision and the flaps dissected back sufficiently far to allow of the application of the trephine round the tumor. If there be any unsound skin, this should be carefully removed; but it is important that as much as possible be retained for covering the exposed dura mater or brain. Bérard performed his operation on two successive days: on the first occasion three quarters of an hour were occupied in applying the trepan six times; on the second, an hour and a half in the remaining ten applications. This mode of dividing the operation might be imitated where the growth is very large; but such dimensions undoubtedly form a special contraindication to its performance. The extensive exposure of meningeal surface is one of the most serious obstacles to success: a writer in the *Gazette Médicale*, commenting on this, enquires whether it might not be remedied by autoplasty. A remarkable circumstance attending Bérard's operation was, that on the removal of the mass, the ordinary symptoms of *compression* of the brain came on; the patient was restored to consciousness by firm pressure on the part of the hemisphere corresponding to the seat of the fungus. This physiological fact may be usefully compared with Magendie's experiments on the cephalorachidian fluid.

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(B.) *Spinal Meninges*. — Cancerous disease of the spinal canal may originate precisely in the same situations as in the skull; but the disease is rare, and of its protrusion externally there have been but few examples preserved by the industry of writers.

Phillipps relates the case of a youth aged 14, who fell from a second story window into the street, whereby his back was bruised, but no fracture caused. The sufferer was able to walk with his body bent forward. Three years and a half after the accident he was seized with violent pain in the back, thighs, and legs, and a tumor began to form over the lumbar vertebræ, which increased to a great size; it was red on the surface, and the source of frequent hæmorrhage. Complete paraplegia, incontinence of urine and fæces, &c. supervened, and the patient died six years after the fall. The tumor consisted of encephaloid, took its origin from the spinal cord, and had spread upwards, as also downwards, extending from the third dorsal vertebra to the coccyx. Several dorsal and lumbar vertebræ were "carious," and some of the latter had altogether disappeared: there was general softening of all the bones of the spine, of the sacrum, and the ileum.

In a case of similar character related by Wolff, the tumor formed at the upper part of the back; the patient had also had a fall, and there was paraplegia and incontinence of urine. Pressure on the swelling caused vertigo and a disagreeable sensation in the front of the head. [Could this have arisen from the forcible repulsion of the cephalo-rachidian fluid into the ventricles?] A second tumor soon appeared in the lumbar region. On post-mortem examina-

tion the new growths were ascertained to possess the chemical and physical constitution of encephaloid; they adhered to the medulla, which was scarcely softer than natural, though its "investments were destroyed in the corresponding places." The spinous processes of eight vertebræ had totally disappeared.

We owe to Lecat the record of a case in which partial excision was performed. G. I., shoemaker, received, in 1750, a violent blow in the loins, after which a "carcinomatous tumor" formed there; the disease destroyed the spinous processes of the four first lumbar vertebræ, and part of the sheath of the medulla. "All these nervous parts [encephaloid matter], dilated into mushroom-like growths, formed the tumor." It was extirpated in 1751 without loss of blood, but "such a prodigious *nervo-lymphatic* discharge followed from the medulla that the thickest cloths were saturated." The patient died of exhaustion in two days.

For the incipient symptoms of the disease we must refer the reader to the medical works below enumerated.

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VII. — *Alimentary Canal.*

(A.) LIPS. — Labial cancer may commence by infiltration of scirrhus, presenting the characteristic properties of

this formation, in a limited extent of the lip and apparently underneath the skin at the junction of that membrane with the mucous surface.¹ After a variable length of time, the skin, or more commonly the mucous tissue, gives way, the resulting fissure discharges a thin acrid fluid; this dries and forms a scab, which falls off or is torn away accidentally and is reproduced. Meanwhile the ulcerative process advances, at first slowly; the formation of regular scabs ceases, and fungous formations spring from the scirrhus basis. These are of the hard species; and we have not met with any instance in which encephaloid matter is alleged to have been produced in this situation. In some cases the production of a cutaneous warty excrescence, such as has been elsewhere described, is the first phenomenon observed: this is not unfrequently tinged with melanic matter. Dr. Warren observes that the cuticular crust continues to be regenerated for years in some subjects, before any thickening of the skin is perceptible; in such cases the affection is not originally cancerous. "The same surgeon describes an example of the disease which commenced by a pustule which after bursting left a scab." As the disease advances, the skin, mucous membrane, and labial glands form a prominent mass, which combined with the fungous productions from the sore, produce an abundant slaver that constantly escapes over the edge of the lip, and irritates and excoriates the adjoining skin. The ulceration may spread over the entire cheek and destroy even part of the external ear; or the morbid formation extend to the maxilla, as in a case observed by Mr. Travers, where an immovable scirrhus tumor extended from this bone to the os hyoides, went through its stages with rapidity, and finally choked the patient while in the act of swallowing. The destruction has been known to extend even to the sternum. It was remarked by Bayle, and the observation

¹ Pearson, Travers.

has been confirmed by others, that so long as the ulcer implicates the skin only, it remains comparatively superficial, but when the mucous membrane is attacked, excavates deeply, destroying all the tissues of the part: this, of course, refers to cases wherein ulceration commences distinctly by the cutaneous surface. The salivary and the lymphatic glands become enlarged and painful; the latter especially may be infiltrated with scirrhus. General contamination of the system is comparatively rare; a remarkable instance of its occurrence, wherein the heart was the seat of numerous cancers, has been related by Mr. Coates¹.

Labial cancer, rather frequent among males, is singularly rare in the other sex. It almost invariably affects the lower lip, and seems not uncommonly to acknowledge as an exciting cause, the irritation of a pipe or tobacco-juice. But the inadequacy of this to produce the disease in a non-predisposed subject appears from the consideration, as Mr. Travers excellently well observes, that "of the number of smokers the proportion of persons so affected does not exceed that of cancerous to sound persons." Rough and prominent edges of teeth act in a similar way.

When the cancerous nature of the disease is established, no time should be lost in removing it. Destruction with caustic has had its advocates, and may be had recourse to in the case of timorous patients, but the knife is greatly preferable. The indurated mass may be removed by two straight converging incisions meeting inferiorly at a point: a triangular portion of tissue is thus cut away, precisely as in the hare-lip operation; the exposed edges are then brought together by the twisted suture. If, however, the disease occupy a large share of the lip, this mode of removal is inapplicable; and a semi-circular or crescentic

¹ Med. Gaz. vol. xviii. p. 575. 1834

section must be substituted for it. Mr. Travers, who has made trial of this plan, mentions the disuse of sutures as one of its principal advantages, and states that in a case where the removal extended to the frænum, the natural appearance of the part was eventually in a great measure restored — “the cut surface takes a depth of color, a plumpness, and a defined border, which has much the appearance of the natural surface.” M. Bégin, arguing upon the contraction of the lip which follows the triangular excision, and the disfiguring protrusion of the sound lip entailed thereby, seems to consider that it should be abandoned altogether in favor of the crescentic operation; it is true, he admits, that the gradual elongation of the divided substance removes the deformity referred to, to a certain extent, but the traction exercised on the labial tissue during this process may, he conceives, contribute to the reproduction of the disease. Dupuytren, likewise an advocate for the semi-circular section, performed it with a pair of strong curved flat scissors; a bistoury is more commonly employed. The wound should be covered with a little moistened lint kept *in situ* by a double-headed bandage passing over the vertex and occiput. The saliva escapes at first abundantly from the mouth, but the reparative efforts of nature usually remove this serious inconvenience: should this not be the case, a silver lip may be adapted to the part; or the lost tissues, as recommended by Mr. Earle, restored by cheiloplasty. The angles of the mouth should be spared, if this can be safely done.

The position of the disease sometimes requires an *impromptu* modification of the ordinary modes of operating. In a case of cancer occupying the right half of the upper lip, and extending to beneath the left ala of the nose, M. A. Bérard removed the mass by two straight parallel incisions perpendicular to the lip and united by a transverse one at the base. Two lateral flaps were then formed by prolong-

ing the transverse incision to the border of each masseter, and by slitting up the cheek from the commissure of the lips to the same point. Each flap, of rectangular shape, had three of its borders free; having been drawn towards each other, the inner edges of these were next united by the twisted suture; the upper similarly fixed to the cheeks and lower part of the nares, and the inferior united in the same way, as far as the commissures of the mouth; part of the inferior cut edge formed the free border of the new lip. The wounds cicatrized by first intention, and the new lip subsequently assumed the appearance of a natural one on which the hare-lip operation had been successfully performed¹.

(B.) TONGUE. — Lingual cancer, which, as far as we have been able to ascertain, is almost invariably of the scirrhus species, commences — 1, As a small distinctly circumscribed but somewhat knotted tumor, generally seated in the anterior part of the organ midway between the raphe and one edge, and rarely extending beyond the middle line; 2, or as a small excrescence, which eventually in some instances becomes pedunculated; 3, or cancerous deposition in rare cases complicates simple ulceration, produced, for example, by the contact of a carious tooth: 4, or, in still rarer instances, erectile tumors become the seat of such deposition.

In either case the surface ulcerates (the mass may have acquired such size as to extrude the tongue from the mouth before this change occurs) and presents the usual phenomena and appearance of carcinomatous ulcers, the fungous formations sometimes assuming the cauliflower shape and attaining large dimensions. The progress of the disease is in some cases extremely rapid; Dr. Warren records an instance in which eleven weeks sufficed to change a

¹ Gaz. Méd. de Paris, p. 541. 1835.

“small hard lump on the edge of the tongue into an extensive ulcerated fungus, rising a quarter of an inch above its surface, and covering half its breadth.” The ulceration may spread to the buccal and gingival mucous membrane, while the non-ulcerated part becomes covered with warty vegetations. The sublingual and submaxillary lymphatic glands undergo the ordinary changes; Mr. Travers has known them form the base of the tumor, while a cauliflower fungus occupied half the tongue and covered the lower jaw.

Acute pain is not a constant symptom; there is generally an aching sensation experienced, varied occasionally by sharp pangs darting in the direction of the ear. The necessity for constant sputation forms one of the most distressing concomitants of the disease: and at night the accumulation of the discharge interferes with the patient's rest by exciting cough. The secreted matters are swallowed in large quantities, and according to Bégín sometimes glide into the respiratory passages; this surgeon attributes the constitutional suffering in some measure to such deglutition. The mechanical action of the growth, particularly when it attains large size, produces pain and difficulty in articulation and in the mastication and deglutition of food, gradually increasing until the performance of these functions becomes an impossibility. As an evil of a minor kind, the jaws are often unconsciously closed on the enlarged organ, which is very painfully compressed. The cachexia is sometimes exhibited in an intense degree.

Mr. Travers fixes upon strong and healthy males of the age of 40 and upwards as the most usual subjects of lingual cancer; the disease is, however, observed not unfrequently in the other sex, and in much younger individuals.

Cancerous disease of this organ is liable to be confounded with some other affections. Mr. Travers describes

a *globular tumor* seated deeply in its substance, very uniform and unyielding on the surface, and like a marble in point of size, and to the feel. He has invariably found this tumor disappear under the use of alkalies and tonics. Having never opened it, or examined its structure, he is only enabled to presume it to be a cyst containing an albuminous fluid. *Syphilitic ulceration*, accompanied with induration, so strongly resembles the scirrhus species, that it is occasionally next to impossible to distinguish them. The former is, according to Bégin, of greater extent; the induration more diffused, furrowed with deep fissures, and furnishing scarcely any discharge. The action of mercury is far from a test of the nature of the sore, as this mineral is sometimes decidedly injurious where no question can be entertained of the really syphilitic nature of the ulcer. Lingual syphilitic sores are almost always secondary, but sometimes *primary*, as is proved by the results of inoculation. *Simple ulceration* generally depending upon the irritation of accumulated tartar or of a carious or prominent tooth, is usually to be distinguished by the rapid cure which follows the removal of the irritating agent. *Erectile tumors*¹ of the surface of the tongue are to be known by the peculiar characters of that tissue: their liability to become the seat of cancerous deposit should not be forgotten. Dr. Warren describes an *enlargement of the mucous glands*, commonly occurring on the side of the tongue, with a red fungous appearance, but differing from cancer by its being "sensitive, not painful, and unattended with real ulceration or thickening of the tongue."

The necessity of operating at an early period cannot be too strongly insisted on, especially on account of the greatly increased difficulty of removal when the disease extends deeply towards the base of the organ. Mr. Travers has

¹ Brown; Lancet, March 30, 1833.

only known [one case operated on at an advanced stage in which a relapse did not occur within a twelvemonth. The morbid growth may be removed by ligature or excision.

The former plan ensures us from the danger of the serious hæmorrhage which sometimes results from division of the ranine, &c. arteries. A curved needle, armed with a double ligature, is passed through the tongue and opposite the central part of the diseased mass; the ligatures are then tightly tied, one in front, the other behind, so as to embrace both divisions of the cancer. This manœuvre is difficult of execution when the disease extends far back, as the posterior ligature can hardly be pushed far enough back to circumscribe it. M. Bégin, too, urges the vast tumefaction, the accumulation of putrid sanies, the pain, the difficulty of breathing, and other serious symptoms which almost inevitably follow this operation, as reasons for rejecting it altogether; he alludes to a case in which it proved fatal in a Parisian Hospital, from the violence of these symptoms.

When about to excise the diseased mass, the surgeon, as a preliminary step, places small cork or wooden wedges between the teeth, to prevent the approximation of the jaws. If the cancer be seated towards the point or at the edge of the organ, it may be seized with the thumb and fore-finger of the left hand, previously covered with linen, and a straight bistoury being passed behind the diseased portion, the whole removed at a single stroke. In some cases the mass is so situated that a piece of triangular shape requires to be removed. Under such circumstances Boyer and Langenbeck recommend the edges of the hiatus to be brought together by suture anteriorly, with a view to prevent hæmorrhage and lessen subsequent deformity. Bégin, however, denies the advantage of the suture in the latter respect, as the tissue of the tongue becomes elon-

gated, and repairs the losses it may have sustained with extraordinary facility. When the disease extends far back, an assistant is required to keep the tongue steadily out of the mouth. The fingers and a piece of linen are usually sufficient for the purpose; where they fail, a pair of forceps with blades terminating in hooked extremities (*velsellum*) may be used to seize the diseased mass, or if particular difficulty arise in any instance, a ligature passed through that part. The surgeon then transfixes the tongue with a straight bistoury behind and without the disease, and bringing it forwards to the apex, separates the healthy tissues laterally; the posterior separation is next effected by carrying the bistoury outwards from the posterior point of the incision to the edge of the tongue. No dressing is required. Serious hæmorrhage, as we have said, sometimes follows. Ligature or torsion of vessels is rarely efficacious in checking it, as the blood flows from a multitude of points on the divided surfaces; ordinary astringent gargles frequently fail, and we have seen cases in which the actual cautery was required to stop the effusion. Where this is necessary, pieces of pasteboard should be placed in the mouth for the protection of the surrounding parts. If the bleeding continue in spite of all other measures, the lingual artery should be taken up above the great cornu of the os hyoides¹. Flaubert, of Lyons, tied the vessel as a preliminary measure.

Should the disease encroach on the base of the tongue, the application of a ligature in the ordinary way is, as has been stated, far from easy and may be impracticable. Under these circumstances the complaint had been considered beyond the reach of surgical interference, until the bold performances of Jules Cloquet, Mirault², and Mr.

¹ See Fig. 85. No. 3. p. 263.

² Dict. de Méd. 2^{ème} éd. t. xvii. p. 497.

Arnott,¹ proved that a ligature might be safely applied from beneath the jaw.

[Mr. Arnott thus describes his operation, which was practised on a girl 18 years old, for a disease apparently of a malignant character. "The patient being seated, the head slightly extended, and the os hyoides felt, an incision was made from over it upwards, and forwards, an inch and a half in length in the mesial line, through the skin, cellular substance, and raphe, of the mylo-hyoid muscles. With the edge of the knife, but chiefly by its handle, way was made by the finger between the two genio-hyoid and the two genio glossi muscles.

"A tenaculum was next passed through the apex of the tongue, by means of which it was drawn out of the mouth and held so during the subsequent part of the operation by Mr. Mayo (Mr. Tuson, Dr. Warren of Boston, U. S., and Mr. Phillips, being likewise present). Into the wound in the neck, a strong needle with an eye at the point, in a fixed handle, was now conducted and passed through the basis of the tongue into the pharynx a little to the left of the mesial line; the loop of ligature which it carried was then, by means of a blunt hook, drawn forwards out of the mouth, and the needle withdrawn from the wound over one of the ends. The loop being cut, two ligatures were obtained; one of these was placed along the upper surface of the tongue, so as to bound the disease on its left side, and carried through the apex of the tongue from above downwards, by means of a large curved needle, through which the oral end of the other ligature was *now* also passed. Fixed in a porte-aigaille, this needle was next carried through the floor of the mouth immediately be-

¹ Med. Chir. Trans. vol. xxii. p. 20. 1839.

hind the last molar tooth, on the right side, directed at first, and for the greater part of its course, perpendicularly downwards, then inclined mesial, and brought out at the incision in the neck. There were thus two ligatures, the four ends of which hung out of this wound. One of the loops was so disposed as to encircle the right half of the tongue at its basis beyond the tumor; the other was placed longitudinally on the upper surface of the tongue, longitudinally and obliquely below. Being tied (and this was done as tightly as possible), the diseased mass was circumscribed posterially, laterally, and in some measure inferiorly. A third ligature was now passed through the fore part of the tongue, so as to isolate at this part the diseased from the healthy structure."

This patient recovered from the operation after seventeen days, the disease being quite destroyed. M. Cloquet performed much the same operation with that described by Mr. Arnott, which proved fatal on the third day. In another case operated on by M. Mirault, the patient recovered in two months. The operation is excessively difficult and dangerous, and not to be imitated unless in extreme cases, where recourse to the knife and the cautery are prevented by the extension of the disease to the base of the tongue.—W.]

(c.) TONSILS. — Hypertrophous induration of the tonsils is a condition of most common occurrence, while the deposition of true scirrhus in these glands is exceedingly rare. Their removal is strongly indicated if, resisting ordinary treatment, they continue to increase in size; for if they really be the seat of cancerous infiltration, this may extend backwards into the pharynx beyond the easy reach of instruments.

[A case of considerable interest of schirrous affection commencing in the tonsil came under our observation some years since, and has been described by Dr. Warren in his work on

Tumors. From the rarity of the disease in this situation, we have been led to transcribe it. "The patient was sixty years old, and had been laboring under a schirrous tumor on the left side of the pharynx for some years. When I saw it the fauces were nearly filled, respiration was impeded, and deglutition difficult. Her pulse was quick, tongue furred, appetite poor, and she had the aspect of a person sinking under the pressure of disease. I was disposed to decline any operation from the little hope of a radical cure, and the great danger of immediate death. Dr. Shattuck urged that she must die with the disease, and that, if the removal of the tumor did not effect eradication, it yet might give some relief from the distressing state in which she was. These reasons influenced me to perform the operation immediately. The jaws being fixed, the hard tumor was seized with a pointed forceps, and with a round-edged knife I removed the mass by two strokes of the instrument. An enormous gush of blood followed. Passing the finger in, I felt another mass in the pharynx below the first, which was seized and cut out with a fresh pointed bistoury. When the hæmorrhage had a little subsided, a red hot iron was passed on a conductor, to the diseased spot twice. No further hæmorrhage occurred. The next day I left town, and consigned the charge of the patient to my son for some weeks. On my return, I found the patient contrary to my expectation in a convalescent state. The quickness of the pulse had subsided, appetite had returned, no difficulty in swallowing remained. I was informed that some applications of caustic potass had been required, and an exfoliation of a small piece of the maxillary bone followed. After this she wholly recovered her health. The tumor it should have been stated was partly of a cartilaginous consistence and contained also calcareous matter¹."

¹ "In the winter of 1836 this lady was from sudden exposure at-

If the cancerous disease be limited to the tonsil itself, the use of the guillotine instrument is preferable to that of the bistoury, on account of the hæmorrhage so likely to occur from the use of the latter. In nearly 200 operations with this instrument in cases of common induration of the tonsils, we have never had a single case of troublesome bleeding. For a description of this instrument we refer to Dr. Warren's book on tumors, page 761, and for the practical application of it, to some remarks on enlargement of the tonsils which we have published in the *Phil. Med. Examiner*. 1839. The use of the ligature formerly employed for the removal of these bodies is now almost entirely discarded. — W.]

We have never observed encephaloid tumor or infiltration of these glands, and believe that the following description by Dr. Carswell is almost unique. In speaking of cancer of the lymphatic system we have referred to the subject furnishing these very remarkable appearances. "The amygdalæ, formed entirely of cerebriform matter, presented a pale yellow color tinged here and there with red specks, produced apparently from the rupture of minute blood-vessels. They had also lost that characteristic appearance from which they derive their name, having become almost perfectly smooth, from the accumulation of the cerebriform matter and the distension of their envelope."

(D.) PHARYNX. — Scirrhus of the infiltrated form is the species of cancer most commonly observed in the pharynx; cerebriform growths, except in the shape of fungating masses, from an ulcerated basis, have been more rarely met

tacked with a fatal peritonitis. The body being examined after death was found to exhibit an extraordinary mal-position of the thoracic and abdominal organs, which has been described by Dr. Mason Warren in the *Am. Journ. Med. Scienc.*"

with in this situation. Carcinoma of the pharynx is under all circumstances an uncommon disease. When first examined it usually presents itself as a hard imperfectly circumscribed mass, occupying a variable extent of the submucous tissue of the canal, and invested by the mucous membrane, which in the early stages retains to all appearance its normal characters. The swelling or tumor — for, from the abundance of infiltration, distinct and irregularly rounded elevation is produced — may be pressed, unless its mucous surface be accidentally inflamed, without exciting pain. Eventually the surface ulcerates and the opening presents the characters elsewhere assigned to cancerous ulceration, gives rise to the same hæmorrhage and fœtid discharge, while fungating growths, with the tendency to the pyriform and cauliflower-shape, sprout from its edges or centre. The diseased mass is now tender to the touch. The destructive process spreads in different directions; in a case we had an opportunity of observing at the Hôtel-Dieu in 1835, the base of the tongue, the velum palati, and part of the epiglottis were destroyed; in other instances the œsophagus, the posterior region of the nares, &c. suffer. The cervical glands undergo the changes observed in cancerous disease.

It would appear that the morbid matter in many cases accumulates to some amount before it excites any very distinct symptom; a sensation of fullness in the affected region, and trifling difficulty in swallowing, have often existed for some time before they become sufficiently troublesome to alarm the patient. But the supervention of pain at length rouses his apprehensions, and the pharynx, examined at this period, generally presents the incipient changes above described. The dysphagia increases, the ingesta, both solid and liquid, frequently return through the nostrils in the efforts to swallow, and deglutition at length becomes impossible without the aid of instruments.

Before this, ulceration has usually set in, and the discharge from the sore is rejected from time to time with a painful effort, evidently distinct from that of vomiting. Part of the sanies, however, is swallowed, or gravitates into the stomach, where its presence excites nausea, and sometimes, it is said, a burning sensation. The extension of the disease to the larynx is announced by a change in the voice, which rarely, however, terminates in complete aphonia. The posterior nares are sometimes obstructed with fungating productions: in this case, according to the remark of Bayle, there is dyspnœa. Sir C. Bell and Mr. Travers speak of "difficult breathing, frequent spasms and alarms of suffocation," as constituting part of the symptoms; under these circumstances the air-passages must be obstructed, either directly or indirectly, by the volume of the mass in the pharynx. Here, as in other regions, hæmorrhage may be the very first symptom noticed. In the case we observed at the Hôtel-Dieu, a profuse discharge of blood took place, before any pain or difficulty in deglutition had been experienced — a fact placed beyond all doubt by the uniformity of the patient's replies under repeated questioning. The effusion of blood frequently recurred and finally proved the cause of death; an opening of small size was discovered in the internal maxillary artery. The ordinary mode of death in cases of pharyngeal cancer is however by inanition; the sufferer falls into the last stage of marasmus, and exhibits with its usual characters the cancerous facies and discolored skin. The disease may prove fatal by extending to the larynx, as in a case related by Sir C. Bell¹.

Simple hypertrophy of the walls of the pharynx is so rare an affection, that we have not been able to find a sufficient number of cases for the purpose of ascertaining the points by which it is distinguished from carcinomatous infiltration;

¹ Surg. Obs. vol. i. p. 53.

yet the importance of the distinction for the surgeon's reputation is obvious. Simple induration, with thickening of the submucous tunic, will entail the same dysphagia as cancer, and, as we have had an opportunity of observing, lead to the rejection of the food through the nares. The effects of treatment and the ulterior progress of the disease should be watched for a time, before a decisive opinion is ventured upon. — *Hernia* of the mucous, through the fibres of the muscular coat¹, is accompanied with difficulty of deglutition and is only to be distinguished by most careful examination. The distinction of certain *venereal and scrofulous sores* from cancerous ulceration is to be established by the commemorative symptoms, the constitution of the subject, the state of other organs, and generally by the effects of treatment. Inoculation will not settle the question of the syphilitic or cancerous nature of a pharyngeal sore; for venereal ulcers are in this situation secondary, and the matter of such surfaces does not, as M. Ricord has shown, produce chancre by inoculation.

In the treatment of cancer of the pharynx the surgeon is almost completely restricted to palliative measures. Pain may be relieved by emollient and narcotic gargles; the fetor and nauseous character of the discharge lessened by the use of the chlorides in the same way. The obstruction to deglutition is sometimes so considerable, and this for a length of time before death, that the use of the œsophagus-tube is required. But whatever delicacy and gentleness be observed in the introduction of this instrument, its repeated passage causes much irritation; this is in some instances so violent and accompanied with such copious hæmorrhage, that persisting in its use would only hasten the unfortunate

1 Ludlow in Med. Obs. and Inq. vol. iii.; and C. Bell, loc. cit. p. 66.

sufferer's end: in cases of this kind the tube may be left permanently in the canal; in this way its presence is not productive in *some* subjects of nearly so much irritation. Nutritious enemata and baths are indicated as a last resource. Hæmorrhage may be restrained by astringent gargles.

Bégin and writers of the Broussaisian school of course recommend the direct application of leeches to the diseased part: chronic inflammatory induration may be thus removed, but there is no proof to be found of their *curative* efficacy in carcinoma of this region. Cauterization has been tried, but not with results warranting much confidence in this mode of treatment.

Excision has, so far as we have been able to ascertain, been very rarely attempted. Independently of the general objections to the operation, the difficulty of making out the exact boundaries of the diseased formation, and of removing every particle of that which is discovered, must interfere very seriously with its probable success: nor should it be forgotten that, as Dr. Warren remarks, "a hæmorrhage might present itself from the deep parts involved, which no art could suppress." The steps of the operation — should a case present itself in which the use of the knife seemed practicable — must vary according to the precise part affected; the surgeon should be prepared to meet all difficulties and accidents, which it is possible to anticipate.

(E.) ŒSOPHAGUS. — Cancer of the œsophagus occurs most frequently at the upper end of the canal behind the larynx, most rarely at its middle part, and may, as in a case figured by Baillie, occupy nearly its entire length and circumference. Infiltrated scirrhus deposited in a stratiform manner, encircling the walls of the tube more or less completely, and causing gradual diminution of its calibre, is the most common condition in which the disease presents

itself. Distinct scirrhus tumors are comparatively very uncommon; tuberiform encephaloid still more so.

The formation of cancerous matter in this region is, according to Bayle, commonly preceded by pyrosis, hiccup, and transient pain in the fauces: it is certain, however, that suddenly developed dysphagia is frequently the first sign of its existence. The *nature* of the symptoms of œsophageal cancer is the same as when the disease is seated in the pharynx, but as the contraction is seated lower down, the first stages of deglutition are accomplished naturally. Subsequently, if the coarctation affect the upper end of the canal, the greater part of each mouthful of food at once regurgitates: if a lower part, three or four mouthfuls pass with facility, and the accumulated matter is then gently expelled by the action of the muscular fibres. These occurrences are at first only occasional — a circumstance which tends in some cases to keep alive the hope that the patient suffers from spasmodic stricture only. But the dysphagia eventually becomes permanent, and the obstruction increases to such a degree that not a particle of solid or even liquid food reaches the stomach. Sometimes a dilated pouch forms above the obstruction — here the food accumulates, and is rejected with laborious effort after a variable lapse of time. The ingesta are under these circumstances usually mixed with glairy mucous matter, which is, according to Bayle, never tinged with brownish fluid, and is thus distinguishable from the substances vomited in cancerous disease of the stomach. In a remarkable case related by Mr. Purton¹ exemplifying this condition, the patient, a man aged 43, had for twenty years been subject to attacks, lasting three weeks or more at a time, during which no food directly reached the stomach. Post-mortem examination

¹ Med. and Phys. Journ. vol. xlv. p. 540. 1823.

disclosed a huge pouch extending from two inches below the pharynx to the cardia, and containing two measured quarts of grumous matter and fluid: the cardia was pervious but much contracted. This person had been in the habit of allowing the ingesta to accumulate in the sac for hours, or even days; when it was completely filled, he made efforts at swallowing, by which the contents were forced on to the stomach. For the last six weeks of his life he was reduced to the support of nutritious injections.

The progress of the disease is accompanied with pain, the seat of which indicates, in some rare cases, with much precision, that of the morbid formation. In others the suffering is referred to the entire length of the canal, or is felt in the back, in the shoulders, or in the arms. The extension of the pain in this manner is by Bayle supposed to depend on the formation of adhesions between the cancer and the adjacent parts. Deglutition is frequently accompanied with pain shooting along the fauces to the base of the skull and through the eustachian tube to the ear.

Patients afflicted with cancer of the œsophagus usually perish, as those whose pharynx is similarly diseased, by inanition: the cachexia is commonly well established. They are exposed to the chances of severe hæmorrhage. Perforation of the diseased tube, with effusion of the ingesta into the mediastinum, determining an abscess in that region; the establishment of a communication between the œsophagus and the trachea, bronchi, pleura, or pulmonary tissue, not very unfrequently shorten the patient's days. Yet the existence of such communication with the lung is not incompatible with the continuance of life: M. Moutard-Martin¹ has published a singular case wherein a large cavity, formed in the lung (though partly empty it

¹ Bibl. Méd. t. xxxiv. p. 85. 1811.

contained six ounces of whitish-gray grumous matter) communicated freely with the œsophagus: the food, entering into it with facility, regularly accumulated in this adventitious stomach.

Among the diseases simulating carcinomatous contraction is *spasmodic stricture*, an exceedingly rare affection, but one capable of temporarily obstructing deglutition quite as completely. The sudden occurrence of the complaint, its induction by moral causes or by adjacent irritation, its almost constant accompaniment by nervous symptoms, and the success of antispasmodic and dilating treatment sufficiently characterize this species of dysphagia; sudden supervention of the symptoms is not, however, conclusive of the spasmodic nature of the affection. Chronic inflammation leading to *hypertrophy* and *induration* of the walls of the œsophagus is an affection of much less common occurrence than has been supposed by some writers, and seems hardly to originate except as an effect of the ingestion of poisons; in this case the history of the individual will prevent error¹. A patient, observed by Bayle, perished some months after swallowing nitric acid; two or three inches of the lower third of the œsophagus were so contracted, that a quill could scarcely be passed through it; the walls were in a state of chronic hypertrophy with induration, which differed from scirrhus infiltration in wanting its homogeneous shining and semi-transparent aspect. A curious case of constriction of the œsophagus which appears to have been congenital, is related by M. Cassan². The diameter of the tube was reduced to a French line, yet there was not the least morbid change of tissue; the lower

¹ C. Bell, Surg. Obs. vol. i. p. 82, 1816. Robert, Nouv. Bibl. Méd. t. iv. p. 415. 1827.

² Archives de Méd. t. x. p. 79. 1826.

part of the pharynx formed a huge pouch containing chymous matter. The subject of this disease had not been seriously incommoded by it until the last year of his life, lived to about 77, and had generally enjoyed excellent health: these circumstances would have distinguished the case from cancer. Dysphagia from *paralysis* of the muscular tunic may be recognised by the absence of pain and the facility with which a probang may be passed into the stomach. The obstruction caused by the pressure of mediastinal tumors, of aneurism of the large vessels, &c. may be distinguished by the physical signs furnished by the contents of the thorax. The exact seat of the disease is to be ascertained by the feelings of the patient; sometimes by the discovery of an indurated mass in the neck in the course of the tube: better by the probang or wax bougie.

In some cases the employment of bougies of gradually increasing diameter has distinctly retarded the fatal issue of the disease, but this cannot be regarded as more than palliative under any circumstances. The introduction of an œsophagus-tube may be necessary for passing food into the stomach; if the object be to leave it *in situ* for some time, it should be introduced through the nares; if it be used at each meal, through the mouth. The feelings of the patient are our best guide in making choice of either of these plans.

[In order to introduce an instrument either through the mouth or nares, it is necessary that the head should be supported by an assistant, and held well back, so as to bring the œsophagus as much as possible into a line with the mouth and fauces. The tube well oiled and held as a writing pen, should now be introduced as far back as possible into the pharynx, and then carried down by a continuous and rapid motion into the stomach.

The French recommend to have the œsophagus-tube fortified with a curved stylet, so as to give it a better direction into the back part of the pharynx, and past the epiglottis, the stylet is then to be withdrawn, and the tube forced down as far as necessary. The operator will much facilitate the passage of the instrument by seizing the larynx with the left hand, and drawing it outwards from the spine. For cauterizing a stricture of the œsophagus we have lately seen an instrument employed, suggested by Dr. Warren. It is composed of a hollow silver ball, of a pear-like form unscrewing in the middle, and in its lower part perforated with small apertures, this being firmly fixed to a whalebone handle fifteen inches long. The ball being filled with caustic, finely powdered, is carried down to the strictured part, and allowed to remain as long as is judged proper. In the case above referred to it seemed to answer well its intended purpose. — W.]

The general treatment of cancerous affections should be adopted. Leeching the throat will lessen irritation and in some cases materially relieve the dysphagia. Nutritious injections and baths are a last resource in cases of total obstruction.

(F.) ABDOMINAL CAVITY. — Cancer originating in the small and upper part of the large intestines, in the post-peritonæal, mesenteric, mesocolic, &c. tissues belongs strictly to the province of medicine. Growths thus situated may, however, perforate the abdominal parietes, fungate, and go through the stages of cancerous ulcers. A very interesting case of this kind has recently been related by Mr. Salter¹. The disease was here probably of the colloid species; its exact seat is matter of doubt, as no autopsy was permitted. Some of the colloid substance discharged

¹ Provincial Med. and Surg. Trans. vol. v. p. 326. 1837.

from the perforation was "nearly as hard as cartilage" — showing that the jellylike matter came away in lumps still contained in its loculi; under these circumstances, as mentioned in the general description, this morbid substance is exceedingly firm.

(G.) RECTUM.—Cancerous disease of the rectum may either exist as a primary affection or be propagated from the vagina, or vicinity of the anus. Frequently consecutive in females to utero-vaginal cancer, it is not uncommonly a primary complaint, and comparatively is rarely attended with multiple development of cancer in distant organs. Usually of the scirrhus or colloid species, the morbid matter may be either infiltrated in the walls of the bowel or present itself as a distinct tumor. In the former case a part only, or the entire, of the circumference of the bowel may be affected; in the latter the tumor occupies a particular spot of the cylinder, and, in the greater number of subjects, its posterior aspect. The progress of the affection is the same as in other hollow viscera: fungating masses spring into the cavity of the gut after ulceration, and may be either firm or soft and pulpy. The diseased structure usually terminates abruptly both at the inferior and superior borders; superiorly the bowel may be uniformly dilated, or form a lateral pouch with hypertrophy of the muscular tunic—in some cases there are, besides, simple ulcerations of the mucous membrane. These different particulars are well exhibited in figure IX, copied from Cruveilhier.

Fig. IX.

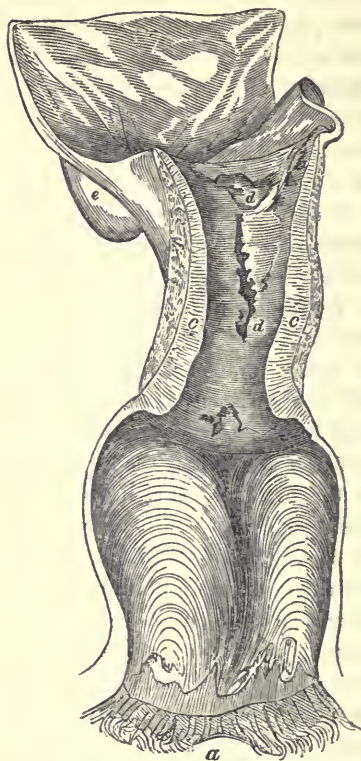


Fig. IX.—a, Anus; b, lower portion of rectum, healthy; c, walls of the gut greatly thickened with infiltration of colloid; d, ulcerations; e, a pouch of the kind alluded to in the text. Longitudinal section of stratiform colloid carcinoma of the rectum.

According to the remark of Bayle, small cancerous excrescences form on the skin round the anus, just as in the neighborhood of mammary carcinoma.

When cancer is primary in the rectum its most common seat is decidedly from two to three inches above the anus;

nevertheless Cruveilhier is perfectly justified in affirming that it does commence in all parts of the gut. The tendency of the disease is to spread upwards rather than downwards. Bégin has known it extend to the transverse colon, transforming all the descending portion of that intestine into a scirrhus duct of three or four inches in some parts of its walls, while the inferior three inches of the rectum had not suffered the slightest diseased change. Mr. Mayo has generally found the disease occupy from four to five inches of the bowel, but has seen it involve as many as sixteen. The degree of constriction varies: in Baillie's plates¹, a specimen is figured through which a goose-quill could with difficulty be passed; but the obstruction may be more complete even than this.

The symptoms differ in the early stage, according to the form under which the affection occurs; the tuberiform variety appears to be, from the first, attended with pain in the sacral region, the nates, thighs, and hips; in the strati-form this is slower in appearing. In both a sensation of uneasiness in the rectum, a feeling as if the gut were never thoroughly evacuated, and a consequent repetition of the act of defecation, twice or more in the same day, sometimes accompanied with tenesmus, are among the first effects of the disease. These may have possibly existed for a considerable time, before the morbid deposition has proceeded to any extent; — the nature of the disease is at this time rarely suspected. Difficulty in defecation progressively increases, a discharge of pus, or muco-pus, frequently accompanies that of the fæces, which are more or less tinged with blood; the latter may be effused in large quantities, but this is not common. Obstinate constipation, alternating with profuse diarrhœa, the former lasting for days, while the accumulation of flatus and fæces swells the

¹ Fas. iv. Pl. iv. Fig. 2.

abdomen to an enormous size, now becomes a formidable symptom. The copious evacuation, eventually brought about either by purgatives or by the natural irritation of acrid mucus, leaves the patient in a state of extreme collapse, and a prolonged fainting fit is not uncommon under the circumstances. Before this relief the symptoms may have become those of internal strangulation, nausea, vomiting of fæciform matter, hiccup, coldness of the extremities, vertigo, and even delirium. Irritation is meanwhile set up in the neighboring parts; and difficult micturition, or, in some cases, on the contrary, incontinence of urine, follows. Abscesses may form around the intestine, and burst into the vagina, in females; an occurrence which sometimes produces much relief, from the facility it affords for the passage of the fæces; in males they open into the bladder or urethra, in which case the patient voids both flatus and fæculent matter by that route. In advanced cases there is œdema of the genitals and lower extremities.—Unless relieved by an operation the symptoms increase in violence—the retention of the intestinal contents becomes complete—not even flatus escapes—extreme tympanitis ensues, with the symptoms of strangulation: or rupture of the bowel from fæcal or gaseous distention occurs, followed by fatal effusion into the peritonæum.

Under particular circumstances there may be variation in these symptoms. When the disease is of the tuberiform character, perfectly circumscribed, and limited to a small part of the gut, defecation may be, as in some cases related by authors, easily accomplished to the last, provided there be no considerable protrusion into the cavity of the bowel. Or the patient may suddenly find himself relieved, in a great measure, of his constipation, in consequence of the separation of prominent fungi, or deep ulceration of a protruding mass. Some subjects suffer from constant diarrhœa, and saved thus from the effects of retention, eventually perish with the cancerous cachexia.

The form of the fæces discharged gives good evidence of stricture; instead of being cylindrical, they are flattened and ribbon-like. This sign is of course wanting in cases attended with habitual diarrhœa. The incapacity of the rectum to receive an enema of the ordinary measure is a useful sign, when the disease, more especially, is seated beyond the reach of the finger. These circumstances, however, throw no light on the nature of the obstruction; nor does the former always distinguish its seat, for Hevin¹ has observed the same appearance in a case of coarctation of the jejunum. An irregular fæcal tumor forms in the left iliac region.—Examination with the finger, bougies, and the speculum ani, further establish the condition of the gut. The former of these modes requires considerable tact, in order to be made as useful as it is capable of becoming; and, as Amussat² judiciously observes, the student should familiarize himself, by exercise on the dead subject, with the differences in the relations of the part observable in subjects of different age, sex, &c. He also states, that by introducing the finger from behind, the surgeon is enabled to push it much further into the intestine, than if this be done from before or laterally. The situation of the obstruction, its degree, the state of the walls of the gut, the presence of a tumor, or of a stratiform mass, of ulceration, or of fungous formations, are thus ascertained. When the disease is originally seated too high up to be touched by the finger, it may, at a later period, be brought within reach of this from being gradually forced downwards by the accumulation of fæces above it. Cruveilhier was, from this cause, enabled to reach a stricture which post-mortem examination proved to be seated five or six inches from the anus. The characters of the disease may be sometimes

¹ Mém. sur la Passion Iliaque, quoted by Costallat in *Essai sur un Nouveau Mode de Dilatation*, &c. Paris, 1834.

² *Gaz. Méd., de Paris*, Déc. 1838; Jan. 1839; Oct. 1839.

ascertained with further accuracy by the soft wax bougie: when the disease is high up in the gut, the use of this instrument is still more valuable, but also attended with difficulty, as in cases of extreme constriction it is no easy matter to find the central canal. This becomes of importance in respect of the treatment, and M. Amussat has endeavored to overcome the difficulty by some contrivances which are noticed in the article *RECTUM*, *Cycl. Prac. Surg.*, where may also be found directions respecting the mode of introducing the instrument: it is only necessary to state here, that if gentleness be requisite under all conditions of disease, it is essentially so in cases of cancer. The speculum ani may be advantageously employed, when doubt exists as to the presence or degree of ulceration, &c., provided the affection occupy the lower part of the bowel.

It is to be regretted that in his recent calculation of the relative frequency of organic stricture of the rectum in the two sexes, M. A. Bérard¹ has not specified the nature of the morbid contraction in the forty-three instances, of which twenty-three occurred among women, and twenty among men. Judging from the general laws of the disease, it is probable that cancer is here, as elsewhere, more frequent in the female sex; and such is the result of Mr. Copeland's and Mr. Mayo's experience. Desault's commonly quoted estimate is unworthy of confidence, as well from the small number of cases on which it is founded, as the uncertainty of the nature of those cases. Cancer of the rectum is commonly a disease of adult and advanced age; yet it may occur in extreme youth; Mr. Mayo has observed ulcerated scirrhus in a subject of twelve years old. Dionis² speaks as if "fungus" of the rectum were an acknowledged effect of pæderasty; the error of this notion is now ascertained.

¹ *Gaz. Med. Mars*, 1839.

² *Cours d'Opérations*, p. 320.

Various conditions of the gut, dependent on chronic inflammation, are liable to be confounded with cancerous stricture. Thus, *hypertrophy and induration* of the sub-mucous and other tissues of the bowel (simple stricture) produces almost all the local symptoms of the disease under consideration;—this affection is, however, generally seated higher up in the canal towards the sacro-iliac synchondrosis, is less painful, and more readily influenced by treatment. *Simple chronic ulcer* of the rectum, as of the mucous passages generally, when in the course of cicatrization, is accompanied with fibrous formation and contraction of the tissues engaged in the process; a case of this kind, related by Cruveilhier, was attended not only by the local but the general symptoms of a cancerous affection; the distinction under these circumstances would appear to be scarcely possible during life. However, the similarity to cancerous disease is not always so perfect as in this instance, and the affection may commonly be recognised by physical examination. This appears to have been the fact in a case described by Dr. Hodgkin¹. It is a curious fact, that the cure of such ulcers in this situation entails much more dangerous effects than the original disease. Chronic inflammation, with *perforations of and partial sinuses in the bowel*, is distinguished by examination with the finger. *Spasmodic stricture* is an affection more written about than observed; of course we exclude from this observation spasmodic contraction of the sphincters, with or without fissure, a condition as painful in its effects as easily distinguished by examination. *Paralysis* of the gut is recognised by the masses of fæces of natural appearance, which are sometimes discharged after accumulation in the dilated bowel, and by the absence of constriction as discovered by the finger and bougie. *Enlargement of neighboring parts*, as of

¹ Bright's Reports, vol. i. p. 117.

the prostate or uterus, displacements of the latter organ, tumors of the mesentery or ovary, urinary calculi¹, a pessary², may produce extreme difficulty in defecation; careful examination of all the parts concerned is requisite to assure ourselves of the nature of the obstruction.

In the medical treatment of the disease, our most important object must be to facilitate, as far as possible, and by the most gentle and unirritating means, a regular action of the bowels. Simple enemata of warm water, with gentle laxatives, will commonly suffice for the purpose for some time; at a more advanced period, medicines of greater activity may be absolutely required. Mr. Mayo advises a few drops of laudanum to be taken after each evacuation. But however necessary it may ultimately become, there is a strong objection to the use of opium, whether in the form of suppository or otherwise, in its tendency to increase constipation and retard the periodical evacuation by which some patients are relieved: large doses of hyoscyamus are preferable, so long as they produce a sufficient anodyne effect. Leeches to the sacrum or perinæum, mitigate pain and lessen spasm. Sir B. Brodie advises the use of linseed oil in injections, either pure or combined with limewater, for relieving irritation, and alkalies with balsam of copaiba internally.

Upon the advisability of attempting to dilate carcinomatous stricture of the rectum with bougies or other contrivances, opinion is divided. Although we find Bégin affirming that he has been very successful in the treatment of this affection (when so situated as to be unfit for removal with the knife), by the application of leeches through the speculum to the diseased part, and by compression it is just to add, that the majority of practitioners, especially of our own country, regard the plan not only

¹ Tulpus, Obs. Med. lib. iii. cap. 2.

² Marquet, Traité de l'Hydropisie, &c. p. 160. 1770.

as useless, but injurious. And it argues ill for M. Bégin's performances, that the case he has chosen to illustrate them, was probably not carcinomatous, and under all circumstances, only temporarily benefitted. There can be little question, however, of the propriety of using the bougie as a palliative, when the obstruction begins materially to affect the excretion of the fæces;—necessity then points to its use. In more fortunate cases its occasional employment is sufficient, producing a degree of relief which carries the patient successfully through for some days, or even weeks: in other instances it becomes necessary to introduce it before each evacuation. This, after a while, excites irritation, sometimes such as the patient cannot endure; and when the cancer is ulcerated, and the seat of tender, soft, and hæmorrhagic fungous growths, catheterism of the tube becomes impossible. Here the disease cannot even be relieved, except by an operation. Mr. Mayo has recourse to divisions of the mass with the knife in cases of fungoid scirrhus, when the sensibility is so extreme, and the growth so large, that the bougie cannot be borne or introduced. A case is related in which this mode of widening the channel was productive of relief. We may state here that Mr. Stafford has recently¹ recommended the division of the gut when, among other conditions, "carcinomatous ulceration is likely to occur; the freeing the part, and thus relieving the irritation kept up in (is?) the most likely way, although it cannot be depended on with certainty, of preventing the mischief." Analogy is certainly strongly opposed to this idea; incising a scirrhus breast would be rather an unlikely way of delaying the occurrence of ulceration: but if experience be on Mr. Stafford's side, theoretical objections are of course without force.—A variety of materials have been employed as

¹ Ed. Med. and Surg. Journ. vol. li. p. 363. 1839.

dilating bodies, cylinders of shredded lint (*mèches de charpie*), elastic gum bougies, soft wax, tallow candles, Arnott's dilator, the *Fucus Esculentus*¹, ivory softened in an acid (Mr. Alex. Ure), &c.; but the softest of these are decidedly to be preferred in carcinomatous cases. The introduction of a hollow tube, through which water may be injected, and the fæces washed away, is recommended, and is sometimes, but this is rare, of real use: as Desault long since remarked, even flatus cannot, in many cases, be made to escape through it. Galvanism has been tried as a means of stimulating the intestinal fibres to action, but little is to be hoped from its employment.

M. Amussat is in the habit of treating cancerous ulcers and fungosities by cauterization with a stick of caustic potass or nitrate of silver; following up this plan, after the separation of the eschars, by compression and dilatation. The dangers attending cauterization of the cervix uteri are increased in the instance of the rectum by the greater difficulty of the operation; and the amount of benefit thus obtained is not stated.

The process of breaking down fungous masses in the rectum can never be more than palliative: as an example of its results we subjoin the following abridged account from the practice of M. Amussat. A man ætat. 62 presented a carcinomatous ulcerated ring surrounding the intestine, measuring $1\frac{3}{4}$ inches in length, and commencing $2\frac{1}{2}$ inches above the sphincters: the coarctation was almost sufficient to prevent the finger from passing into the narrowed part. The ligature, dilatation, or excision were decided in consultation to be inapplicable — the latter from the fear even of slight hæmorrhage which, it was apprehended, must have carried off the patient. The most prominent granulations of the mass were consequently

¹ Aitkin, Prov. Med. and Surg. Trans. vol. vii. 1839.

broken up with strong pincers; the operation is said to have been scarcely felt by the patient, and attended with no hæmorrhage. Eight days after M. Amussat commenced cauterizing, repeating this every third or fourth day for a considerable time. The tumor was thus reduced to half its previous size; but, notwithstanding this, the patient's condition grew more and more alarming, and it became necessary to form an artificial anus to save his life.

Extirpation may be undertaken, either when the disease consists of a distinctly circumscribed tumor, or of a strati-form mass involving part of or the entire circumference of the gut. A tumor may be removed by ligature or excision. The former operation, which saves the patient from the risk of hæmorrhage, may be done with a silk thread, if the basis of the growth be narrow: with silver wire under the contrary circumstances.

The removal of a mass encircling the gut is an operation of greater importance. Velpeau states¹ that an inch and a half of the entire circumference was successfully excised by Faget in 1739—defecation proceeding with the new anus as comfortably as in the natural state of the parts. The merit of reviving this operation in the present century rests with Lisfranc. Among nine operations of the kind performed by this surgeon before 1830, five terminated by a cure; in one instance the issue was doubtful; three cases ended fatally. In two of the latter, purulent effusion in the pelvis and phlebitis were the causes of death; the body of the third subject was not opened. Mr. Mayo has, also, removed in one instance a portion of the entire cylinder of the rectum; the patient was exceedingly benefitted by the operation; she had prolapsus afterwards, however, and died of inflammation in the abdomen two years after. It is indispensable for success that the limits of the disease be

¹ Méd. Opérat. t. iii.

within easy reach of the finger (three inches have been removed), and that the surrounding cellular tissue be healthy, so as to permit the bowel to be drawn down with facility during the operation. Should the entire substance of the parietes be affected, the case is unfit for operation if the disease extend more than an inch above the anus.

Velpeau describes the steps of the operation as follows. The patient having been placed on his side, as in the operation for fistula in ano, with the thighs kept apart by a pillow and flexed at a right angle on the trunk, the anus is encompassed by two semilunar incisions joining anteriorly and posteriorly, and the resulting flaps dissected up to the edge of the sphincter. The left index finger is then introduced for the purpose of bringing down the diseased mass as low as possible, while an assistant draws the dissected ellipse of integuments in the same direction. The surgeon then cuts away the adhesions of the diseased gut by semicircular sweeps of the knife, and finishes by dividing the intestine transversely either with the bistoury or with curved scissors. When the cancer is deeply seated or extensively adherent, Lisfranc divides the posterior angle of the dissected ellipse with strong straight scissors, extending this division tolerably high along the rectum: the dissection is facilitated by an assistant drawing down the gut with hooks or strong forceps. The knife of the operator is guided by a finger in ano, and by the thumb placed on the external surface of the flap. One of the most important points to bear in mind is the position of the hollow organs in front of the gut. Their situation may be marked by the finger of an assistant in the vagina, or by a sound in the male urethra; but these guides will be of little value unless the operator possess perfect anatomical knowledge. M. Costallat states that "an autopsy which took place at the Venereal Hospital shows, that through the action of a cancer situated at the inferior part of the rectum, the

cul-de-sac of the peritoneum may be brought within sixteen lines (Fr.) of the anus; whereas in the normal state, it is double or even treble as far from the orifice of the bowel." This is an anatomical fact of most serious importance. — The arteries should be tied when divided; when this precaution has been taken there is rarely any severe hæmorrhage, or such as resists the application of lint steeped in cold water. A thick roll of shredded lint is introduced after the operation, and in order to prevent the tendency of the intestine to coarctation from becoming troublesome, the use of some contrivance of the kind should be persisted in for a time — say, a few weeks at least. The wound commences to contract from the fifteenth to the twentieth day, — the external and internal parts approximate, and eventually the visible loss of substance does not amount to more than an inch in width. The fibres of the levator ani, the aponeuroses and the end of the rectum form a sort of substitute for the sphincter: the patient, however, has commonly no control over liquid fæces, though the individual operated upon by Faget could even retain flatus. Whatever may have been the success of Lisfranc, opinion is far from being strongly favorable to this operation, even in Paris: Amussat affirms that it "rarely succeeds." It may be observed, however, that the indication for removing a portion of the rectum obstructed by cancer is infinitely stronger than for the amputation of a cancerous breast. In both situations, it is true, the disease must destroy life, unless removed — but in the case of the rectum the free discharge of the function is demanded for daily existence. The comparative rarity of visceral contamination in rectal cancer is a general argument in favor of excision.

Surgery has yet another mode — in the establishment of an artificial anus — of relieving sufferers from obstructed rectum, and of warding off imminent death. There are at least seven cases on record in which this operation has

been performed on the adult subject, when every effort to relieve the distended bowels having been made in vain, symptoms of stercoral tympanitis and strangulation with momentary risk of rupture of the intestines had set in. Five of these operations proved completely successful, and in one of the others the fatal event was mainly due to previous unskilful treatment: the operation is therefore warrantable in a surgical point of view¹. When the indications for performing it arise, the patient should be allowed to choose for himself between certain death and the prospect of life with the inconveniences of an artificial anus, which the formation of such an opening affords. When the disease is cancerous, the chances of ultimate advantage are, of course, vastly less than in cases of retention from simple induration; but even here it may be justifiably performed, provided the patient, after having been made fully acquainted with the nature and likelihood of the benefit to follow, still desires to undergo it.

[The importance which the operation for artificial anus is likely to take in surgery has induced us to give the following translation, from the last edition of Malgaigne, of the different methods for performing this operation. The method of Callisen as modified by Amussat is evidently the most safe, and the most practicable, the peritoneum being respected, and the aperture being on the back instead of the front part of the body.

I. METHOD OF LITTRE. — The patient lying upon his back, an incision is made in the left iliac region, commencing on a level with the antero-superior spinous process of the ilium, and prolonged nearly parallel to Poupart's ligament, for the extent of two inches and a half or three inches. The integuments, muscles, and fascia transversalis are divided in turn, with the requisite precautions: the

¹ See Medical Gazette, July, 1840.

peritoneum is then opened, and the sigmoid flexure sought for, which is found in the iliac fossa. Sometimes it has happened that immediately after the opening of the peritoneum, a portion of the small intestine has made its way externally; and its dilatation, and red color from inflammation, may occasion some doubt to the operator. The nature of the intestine is recognised by the absence of wrinkles and of the longitudinal bands, and by the resistance of the mesentery which arises from the right side, while the resistance of the iliac meso-colon is perceived on the left side. The colon also tends of its own accord to present itself to the opening. A suture is now passed into the meso-colon to fix the intestine to the opening, and the latter is divided in the direction of its length. The intestine immediately evacuates itself; and at the expiration of three or four days, when sufficient adhesion has united the intestine to the peritoneum and external wound, the thread is withdrawn from the mesentery, and care is taken that the new anus does not become too much contracted.

It has been proposed to unite the wound of the intestine by points of suture to the external wound, which does not appear indispensable. The intestine held by the thread has no tendency to return; and the other plan, which has also been proposed, of performing the operation at two separate times, and not to open the intestine till its adhesion to the external wound has been completed, seems with difficulty to be reconcilable with an operation which is only practised in cases of urgent necessity.

METHOD OF CALLISEN. — Surgical Anatomy. The left lumbar colon descends at first in front of the kidneys, from which it is only separated by the fat, then in front of the aponeurosis of the transversalis and quadratus lumborum, from which it is also separated by a thin layer of adipose tissue. Beneath this aponeurosis it reaches the crest of the ilium, below which it is no longer accessible to our

instruments; it must then be sought for between the kidney and the crest of the ilium.

In general, it answers to the aponeurotic fissure which separates the quadratus lumborum from the transversalis, and which itself corresponds to the external border of the common mass of the sacro-lumbalis and longissimus dorsi, easily recognised beneath the skin in subjects of moderate embonpoint. Sometimes, however, it extends more internally, and is then concealed, at least in a great degree, by the quadratus lumborum. We see that in all these cases it is on a level with the external edge of the sacro-lumbalis, and when more deeply seated the most certain point of finding it is beneath the external border of the sacro-lumbalis.

The layers to be divided are the skin, and the subcutaneous fatty tissue: below this, the longissimus dorsi behind, the external oblique in front; still more deeply, the internal oblique, the transversalis, then the aponeurosis of the transversalis, common also to the quadratus lumborum; next the adipose layer covering the intestine, and finally the intestine itself. But the following are the most important relations.

Almost constantly, both in the adult, and in the infant, the left colon is destitute of peritoneum in the posterior third of its circumference, and especially when it is distended by gas and fecal matter. But the space in which it is thus deprived of its serous covering is very variable, and the greater care must be taken not to injure the peritoneum upon its outer side, for this membrane at this point is very thin, and nearly adherent to the aponeurosis of the transversalis. No certain sign informs us of this limit; more often, the position alone warns us that we are upon the colon rather than upon another intestine, which would be covered by the parietal peritoneum; for of the three longitudinal bands, which might serve as our guide, one lies in front, another on the inner side, and the third on the outer;

the space comprised between the two latter is to be attacked from behind.

The operation therefore, to preserve its essential advantage, which is the integrity of the peritoneum, requires great dexterity of hand and manifold precautions; we must therefore reject at once the method of Callisen, which by a simple longitudinal incision, does not permit the operator to see sufficiently what he is about.

The only parts besides injured are one of the dorsal nerves, which may be divided without great inconvenience, and some insignificant arteries.

METHOD OF M. AMUSSAT. — The patient is laid upon his belly, slightly inclined to the right side, and the abdomen raised by one or two pillows. A transverse incision is made in the skin, two fingers' breadth above the crest of the ilium, commencing from the external border of the common mass of the sacro-lumbalis and longissimus dorsi, and continuing outwards for the extent of four or five fingers' breadths. Having passed through the skin and subcutaneous layers the operator falls upon the longissimus dorsi, which must be divided across in the posterior third of the incision, and upon the external oblique, which is divided in the two anterior thirds; below these are the internal oblique, the transversalis, and its aponeurosis. All these muscular layers should be divided at first across, then vertically, to have a crucial incision, whereby the intestine will be better disclosed; if necessary the quadratus lumborum may be raised, and its external border incised. Finally the surgeon arrives at the adipose tissue which envelops the colon, and which must be carefully raised; after this the important point is to be sure of the position of the intestine and its limits.

Upon the dead body the colon may be recognised by its greenish hue; this sign also exists sometimes in the living. Percussion proves if we are upon any intestine whatever;

pressure with the finger upon the intestine imparts a sensation of resistance, while external to it there is, as it were, a want of resistance; nevertheless, to remove all doubt, the intestine must be uncovered on both sides. If contracted, it should be sought for farther back; sometimes in this case it is completely concealed under the quadratus lumborum, which must be divided.

The colon being at last recognised, it is traversed above and below with two needles, so that it can be stretched by two pieces of thread, separated rather more than an inch from each other. In the interval between the threads an opening is made with the trocar; the exit of gas, or even of mixed fecal matter proves the opening is actually in the intestine, and with a hernial bistoury a crucial incision is made. The contents beginning to issue, their expulsion is aided by one or two injections of tepid water directed towards the superior and inferior end of the intestine. When the belly is well disengaged, the opening in the intestine is drawn in front by means of three torsion forceps, and fixed to the skin by four points of interrupted suture, the mucous membrane being turned outwards. M. Amussat has remarked, that for this suture the acupuncture needles of platina cause far less pain than the ordinary suture needles. If after the incision of the intestine the contents do not appear, the suture should be made before employing the injections.

The operation may be terminated by uniting by points of suture the posterior and even the anterior angle of the cutaneous incisions; this, however, depends on the extent of the wound.

M. Amussat had observed that by drawing out with the forceps the edges of the intestinal opening, the entire colon did not yield, but simply its posterior wall; so that the anterior wall forms a sort of spur opposite the opening, hardly observable, as may be ascertained by the finger. This is

true upon the dead body, and true also upon the living at the time of the operation; but we have seen after some days the anterior wall itself become engaged across the opening, and thus form a considerable barrier.

It has been thought an inconvenience would arise from having the anus thus placed upon the side and slightly behind; but the natural anus is itself behind; and simply taking into consideration the sexual relations, without mentioning other circumstances, we should consider it a very great advantage not to have the artificial anus in front. — W.]

(II.) ANUS. — The neighborhood of the anus is probably more frequently the seat of cancerous disease than the interior of the rectum. The disease originates in scirrhus infiltration of the lower part of the walls of the gut; or, as a cutaneous warty excrescence; complicates ulceration of syphilitic origin; or, as Cruveilhier states, “succeeds to irritated hæmorrhoids.”

The induration attending the progress of the disease obstructs the functions of the part, and defecation becomes difficult and painful; but as stricture is rarely induced — the orifice is on the contrary often widened by spreading ulceration — the effects are much less severe, than when the affection is seated in the interior of the rectum.

Prolapsus of the lower part of the bowel, with an hypertrophous state of its walls, is frequently mistaken for cancerous induration: a mass of this kind, removed by Boyer as carcinomatous, is figured in Cruveilhier's twenty-fifth Fasciculus; the induration was here increased by the presence of numerous phlebolites. Bayle is of opinion that elephantiasis of the vicinity of the anus — a local form of the disease which he has carefully described — is only distinguishable during life from cancerous ulceration, by the

¹ Malgaigne, Med. Operation.

absence of cachectic symptoms and the prompt benefit afforded by dilatation.

The true remedy for anal cancer is excision. The operation we have, in conformity with general habit, described under the head of cancer of the rectum, is really only applicable when the disease spreads from the anus: if it originate in the interior of the rectum, the lower inches of the bowel are, as has been stated, generally healthy, and, from its situation, it is unfitted for extirpation.

VIII. — *Air-Passages.*

(A.) NARES. — Cancerous disease of the nares, which is most commonly encephaloid, produces the mechanical effects common to all growths obstructing these passages, such as interference with the ingress of air from the lungs; and as has occasionally been witnessed, obliteration of the lachrymal sac followed by fistula lachrymalis, &c. The pain, hæmorrhages, and discharge are of the ordinary kind.

Tumors appearing in the nasal fossæ may not have originated in those cavities. We have already seen this fact illustrated in the history of perforating cancer of the meninges. M. Cruveilhier refers to a singular case wherein a mass, having the appearance of a fibrous polypus, occupied the right nostril, and was, on post-mortem examination, found to consist of a portion of dura mater, thickened, exhibiting a fungous surface, and containing within it the corresponding parts of the arachnoid and pia mater along with some cerebral substance and pus, the whole forming a hernia through the cribriform plate of the ethmoid bone. The chief safeguard against ill consequences in such cases appears to be in the fact, that the state of disease must be so advanced as to contra-indicate any attempt at operation.

The commemorative symptoms will also sometimes guide us in the diagnosis, and should, under all circumstances, be carefully inquired into.—The *seat* of the disease being ascertained to be in the nose, its *nature* remains to be established. It may be mistaken for different kinds of nasal polypus, but the ordinary effects of cancer are usually sufficiently marked to ensure us from error.

Palliative treatment only is indicated in cancerous disease of the nostrils; should respiration be seriously impeded by abundant growth of encephaloid fungi, these may be cut or torn away; but this is only a measure of temporary utility, as they are rapidly reproduced. The hæmorrhage resulting from their excision in particular may be extremely difficult to control.

(B.) MAXILLARY SINUS.—[The cancerous affections to which the maxillary cavity is subject are encephaloid and scirrhus, and of late years, have been made the subject of a surgical operation, by which the whole bone containing the disease has been removed, and this followed by results of the most gratifying nature. The following case described by Dr. Warren we have been led to introduce in this place, both as affording a complete description of the disease, and diagnostic marks of the different affections with which the malignant tumor of the maxillary sinus may be confounded, with the minute steps of the operation necessary for its removal.

“The patient, Mr. I. G., is 35 years old, well constituted, and in every particular strong and healthful, with the exception of the disease which called for this operation. About nine months since he began to be affected with frequent and considerable bleedings from the nose. These bleedings occurred about once a week, and were sometimes profuse. During the occurrence of one of these attacks he was led to pass his finger deep into the left nostril, and discovered there a tumor about the size of a pea, in the outer side or wall of the cavity.

“The bleedings continued, and the tumor grew till it made a visible appearance in the aperture of the left nostril. Alarmed at this, he consulted Dr. Winslow Lewis, who suspecting a formidable disease, advised him to apply at the Massachusetts General Hospital for advice and assistance. He was there examined by Dr. Hayward and myself, and presented the following appearances. The left nostril was filled by a tumor of a deep red color and soft consistence, discharging blood freely on being subjected to a slight touch. A probe could be introduced into the cavity on the inner side of the tumor along the septum of the nose; but on the outer wall was soon arrested in its progress by the tumor, which appeared to be connected with this part, and bled so copiously as to prevent a continuance of the examination in this direction. The external appearance of the face being examined, the nose was seen to be tumefied on the left side by the protrusion of the nasal process of the upper jaw, and also by that part of the bone forming the exterior wall of the nasal cavity. On opening the mouth, the hard palate was seen to be the seat of a tumor of an elastic character, oval form, and size sufficient to occupy a considerable portion of this cavity, obviously produced by the pressure of a substance in the nostril above. The mucous membrane of the mouth was not altered in color or consistence.

“On passing the finger through the mouth into the posterior opening of the nostril, this aperture was found to be filled by a soft elastic tumor, similar to that which occupied the anterior aperture. The septum of the nose was slightly inclined into the right nostril.

“Such were the history and appearances of this tumor. Its vivid red color, soft consistence, disposition to bleed, rapid growth, and consequent breaking down of the bones which surrounded it, satisfied me that it was a cephaloma, a malignant fungus, which would destroy the patient's life

in a short time unless extirpated ; and I therefore advised him to enter the Hospital and have it removed. The patient agreed to this course, and went home to make his arrangements.

“In nine days after, he entered. When I came to examine the tumor again, I found that during this short period it had enlarged considerably ; and especially that it had extended to the right side of the palate so far as to leave a small space only between it and the teeth of that side. I was now seriously apprehensive that no operation could wholly eradicate the tumor, and felt much doubt whether it would be expedient to attempt one, in itself always severe, and which in this case would be attended with dangerous bleeding. After weighing the arguments on both sides for three or four days, I came to an affirmative conclusion, provided other gentlemen were of the same opinion. On the Saturday following, the 4th of December, a consultation was held, consisting of Drs. Hayward, Townsend, and Holmes, and these gentlemen being satisfied that as there was no other ground of hope for the patient, and that he must die in a most distressing manner, the operation was decided on, and immediately after executed.

“The principal difficulties I anticipated in this operation were the following:—1. Profuse bleeding, which the character of the tumor, the tendency of blood to the head produced by it, and the fulness of the patient’s habit, seemed to promise. 2. Impracticability of dividing the bones without sawing, as the patient was of an aspect which indicated unusual solidity of the osseous texture. 3. Fatal syncope, from the quantity of blood lost and the pain of the operation.

“To obviate these dangers I proposed—1. Compression of the carotid arteries, tying of the wounded vessels when they bled freely, and the use of the actual cautery. 2. Di-

vision of the bones by the cutting-forceps, which I had caused to be made and used for the last twenty years.

3. Waiting occasionally to give the patient time to recover ; and recruiting him with cordials.

“ Everything being arranged, the patient was placed in a chair, his head well supported, and the operation was then begun in presence of the medical class, and a considerable number of medical gentlemen of the city.

“ I made an incision from the middle of the external edge of the left orbit to the left angle of the mouth, down to the bone. A most copious gush of blood succeeded. The internal flap was then quickly dissected up to the middle of the nose, cutting up at the same time the cartilage of the left wing of the nose, and freeing the globe of the eye from the inferior part of the socket by the division of the inferior oblique muscle, the fascia of the eye and the periosteum. The outer flap was then rapidly dissected from the os malæ and os maxillæ, and around the latter bone as far as its union with the pterygoid process of the sphenoid ; but the uniting space was not at this time penetrated on account of the large pterygoid branch of the internal maxillary, which would have been difficult to secure in this stage of the operation.

“ The two flaps being separated, the anterior extremity of the speno-maxillary fissure was perforated, and I then proceeded to the division of the bones. The os malæ was attacked directly opposite to the perforation in the speno-maxillary fissure. The cutting forceps were then applied to the broadest part of the malar bone, and divided it smoothly in a few seconds. Second, the same instrument was applied at the internal angle of the eye, in an oblique direction from the lower edge of the orbit to the lower termination of the os nasi. Here the projection of the tumor into the orbit occasioned some difficulty, from the little space left for its introduction ; but the instrument being fixed, the bone was divided without difficulty.

“In the mean time the blood continued to flow in torrents. One considerable artery required immediate ligature; and the bleeding of the others was controlled by compression of the carotid artery. The mouth of the patient filling with blood, frequent pauses were required to afford him an opportunity of ejecting it, and occasionally he was recruited by a little wine.

“The most difficult part of the operation remained; that of dividing the sound from the unsound parts within the mouth, and separating the maxillary from the sphenoid and palatine bones without injury to the latter; so as to leave the patient the whole of the soft palate, with the palatine plate of the os palati to support it. In order to accomplish this without dissection, I made an incision through the mucous membrane of the hard palate, beginning at the edge of the palatine plate of the os palati, and extending the incision forwards to the external edge of the jaw, then upwards across the alveoli into the bone. To facilitate this incision, the middle incisor tooth of the left side was taken out in such a way as to break the anterior part of the alveolus. Then by a single stroke of the cutting forceps the upper maxillary bone was divided, and its palatine plate cut through as far as its junction with the os palati. In order to separate the palatine plates of the maxillary and palatine bones, I hoped to be able to clear the mouth of blood for a moment to make a transverse cut between these plates. But to see was impossible, from the flow of blood. Therefore passing the forefinger of the left hand into the mouth, I felt the last molar tooth, and turning the pulp of the finger forwards to receive and support the instrument, I struck a strong-pointed knife through the hard palate at the union of the maxillary and palate bones, separated these bones, and was able also to separate the maxillary bone from the pterygoid process of the sphenoid, and thus accomplished the disunion of all the bones concerned.

Finally, the knife was passed externally behind the upper maxillary bone into the space between this and the pterygoid process, to divide the second branch of the fifth pair of nerves. This was done by a stroke of the instrument, and the patient made a great cry, evincing that this nerve had been reached.

“Seizing the bone with the left hand by its orbital and alveolar portions, it was by a gradual movement started from its situation, and aided by a few touches of the knife, its remaining periosteal attachments were divided, and the whole bone and tumor dislodged from the face.

“The patient having lost much blood, had now become faint, and was therefore placed on a table. The portion of swelled mucous membrane on the right side of the palate was cut off with ease, and it now only remained to arrest the hemorrhage. A ligature was applied to the superior ethmoidal branch, or continuation of the maxillary artery. The hemorrhage from a second artery also required to be arrested. This was not easily done, for it was impossible to discover the orifice of the wounded vessel. It was therefore touched with caustic potass, and lint applied to it. As the bleeding might recur, the wound was not immediately brought together, but was covered with a cold-water compress, and the patient left in the operating theatre. He was able to swallow and speak, notwithstanding his exhaustion and the length of the operation.

“The time expended during the operation I do not know, having always considered it the part of folly to measure an operation by time, rather than the exigencies of the case. I was informed, afterwards, it was over forty minutes, and not an hour as stated by your correspondent. The principal part of this time was expended in waiting for the patient to relieve his mouth and throat of blood, which appeared to embarrass him more than I had expected. But the time employed in the incisions, both of the soft and hard parts,

was short, and certainly could not have exceeded ten minutes.

“In three hours after the operation, no bleeding having occurred, the wound was dressed by passing five sutures and applying a cloth of four thicknesses wet in cold water, to be moistened from time to time; and then he was carried to his bed. He passed the night rather uneasily; but the next day he was more quiet. The pulse, for four or five days after the operation, varied from 80 to 112; at the end of six days it was 72. The third day, the wound being wholly united, the stitches were withdrawn by Mr. Hayward, the house-surgeon, at my request. In two or three days the patient was able to take softened bread, and in three weeks from the operation went home to pass Christmas with his family—in two days after which he was discharged. At the present time, eight weeks after the operation, he is at home—takes food freely and speaks intelligibly. The left eye, at first much swelled, is in a natural state, and he uses it without uneasiness. On the left side of the palate there is an aperture of a triangular form. Through this the os ethmoides may be felt, the projections of which were mistaken by the patient for a return of his disease. The food occasionally passes through this aperture into the nostrils, and embarrasses the patient momentarily. The soft palate is entire. There is a slight paralysis of the left side of the upper lip, from the division of the facial nerve; and a want of sensibility in the left side of the nose and the left upper lip, from the division of the second branch of the fifth pair of nerves.

“*Description of the Tumor.*—The tumor, after its removal, exhibited the following appearances. At its summit appeared the lower floor of the orbit of the eye, at the inside of which was a portion of the nasal process of the os maxillare superius. On its outer part projected one half of the os malæ; below appeared the left half of the palate,

with the exception of the part which belongs to the palatine plate of the os palati. A portion of the fossa canina, and the whole alveolar margin, with the correspondent teeth, were visible. On the inner wall of the mass appeared three considerable red colored lobes, attached to the outer and inferior part of the maxillary cavity, by something like a pedicle about an inch in diameter — the three lobes being connected at their attachment, but separated at their internal or nasal extremity into an anterior, middle, and posterior lobe. The superior maxillary nerve was seen in and behind the orbit. The whole was covered by membranes which separated it from the parts in contact. One lobe had made its way through the bone of the face; the others through the partition between the nostril and antrum.

“Examined by a glass magnifying from twenty to thirty times, the substance of the tumor was found to be composed of semi-transparent globules, which became opaque in alcohol. These were connected by a fibro-cellular substance, which appeared to form a larger part of the tumor than the globules themselves. The texture was in consistence somewhat spongy and elastic, and was very vascular; differing in these points from a tumor of the upper jaw, for which I removed that bone two years since — in which the globules were red and fleshy, though very small, and the interstitial substance was of a firm, scirrhomatous character, and not highly vascular.

“*Remarks.* — The minute account I have been led to give of this operation, may appear tedious and unnecessary. I have been induced to these details from the difficulty I have experienced in this as well as other operations, from the defect of minuteness in their descriptions. Those who are called on to their performance alone feel that no fact relating to them is superfluous; while others, who consult such descriptions from curiosity only, complain with justice

of long descriptions. Besides the general reasons in favor of minuteness, there is one which is particularly applicable to this case. The organs affected were but slightly masked by disease; so that nearly the whole operation could be done with precision by anatomical rules.

“The most important consideration, in regard to this case, is the question, whether an operation should have been done? That the patient would have lost his life from the disease if allowed to pursue its course, there is no doubt. In my practice I have seen a considerable number of cases of bleeding fungous of the antrum and nostrils, which have gone on to a fatal and painful termination, notwithstanding remedies, internal and external; and removal of the tumor from its bony cavity, followed by a careful cauterization of its parietes. In order to judge of the propriety of operating in such cases, we must distinguish from each other the different tumors which begin in the maxillary cavity and extend into the nostrils, and raise the bony parietes of the face, orbit, and palate. I have seen four different species of such tumor. First, the osteo-sarcoma of the upper maxillary bone; second, the fibrous tumor; third, scirrhomia; and fourth, cephaloma.

“The first, osteo-sarcoma, is the most formidable in appearance, and attains the greatest size. Its growth is rapid and luxuriant; it breaks down the surrounding bones, and produces enormous deformity. This affection, terrible as it is in appearance, is tractable by operation, and its careful removal is generally followed by a successful result. The second, fibrous tumor, is of slower growth, and more limited in its ravages. This may be removed with a reasonable certainty of its not returning. Third, scirrhomia. This form of tumor of the antrum is characterized by its hardness, the pains which attend it, its moderate growth, and certain fatality. Fourth, the cephalomatous tumor is rapid in its growth, and of a spongy texture, produces excessive

bleedings, and terminates by death unless removed at an early stage.

“The disease in this case was of the fourth species. It follows, from what has been before stated, that, in our opinion, such a tumor must be removed at an early period, and when in a circumscribed condition. The tumor, in this case, presented these conditions when we first saw it. Afterwards, its rapid increase led to doubts as to the final success of the operation. Still it was limited in its adhesions to the interior of the maxillary cavity; and the slight enlargement of the palate seemed to be rather an effect of its pressure than of its contaminating quality; and as the whole disease was removed, there is certainly ground for the hope that the patient may escape a recurrence. At least there is so to those who do not entertain the idea that all malignant tumors — that is, all the tumors which tend to involve every contiguous texture in their growth — are necessarily and early the products of a contaminated circulating fluid. Those pathologists who are of this latter opinion must of course believe that every operation for the removal of malignant tumors is utterly unavailing. But although it is true that a great number of these are followed by signs of a general vitiation of the blood, my experience of a happy termination of a great number of such diseases will not allow me to fall into this general and sweeping conclusion. It is true that in the present state of science, we have no means of determining in their earlier periods what diseases are malignant. While this uncertainty continues, we must take advantage of it, and believe that when, with similar appearances, some tumors are happily eradicated and others become constitutional, we have grounds for the hope that we may sometimes succeed in the extirpation of local affections which, if allowed to go their course, would become constitutional.

“The perfectly healthy condition of the patient in this

case precludes, in our view, the opinion that a vitiated state of the blood produced the local disease; and the limitation of this disease to a pediculated attachment certainly, in my mind, excites the hope that he may escape the fatal result which, without the extirpation, would have inevitably followed. The possibility of a recurrence of the disease would have prevented my making public this description until the final result had been tested by time, had not a partial statement appeared, which seemed to me to call for the details I have here furnished.

“At this time, three months subsequent to the operation, he seems to be quite well, and has resumed his former occupation. The edge of the wound and the projection of the os ethmoides above it appear sound; and probably will soon with safety permit insertion of a substance to cut off the communication between the mouth and nostril¹.”

Nearly two years have now elapsed since the above operation was performed, and the patient still remains free from a return of the disease, and otherwise in the enjoyment of perfect health. A gold plate has been contrived, which effectually answers the purpose of covering the large aperture made in the roof of the mouth by the removal of the tumor.

To review the steps of the operation then, we have, first an incision of the integuments over the tumor commencing near the external margin of the orbit, and extending to the angle of the mouth; if this be not sufficient, a second incision from opposite the internal angle of the eye to the middle of the upper lip. The flaps being raised and the attachments of the soft parts to the floor of the orbit dissected up—the bones are to be divided. The malar bone at its broad part may be cut through with the forceps into the sphenoidal fissure, or the zygomatic arch, and the junction of the os

¹ Boston Med. and Surg. Journal, 1842.

malæ and frontal bones separately divided ; next the nasal process of the maxillary bone, and finally the junction of the two maxillary bones at the palatine plates are to be separated, one blade of the forceps being introduced into the mouth the other into the nostril an incisor tooth being previously extracted. The soft palate is to be preserved and also the palatine plate of the os palati, if possible. The tumor being removed, the principal arteries which require a ligature are branches of the internal maxillary, and are usually without any great difficulty secured. The wound is approximated by sutures. Some surgeons have practised filling the cavity resulting from the ablation of the bone with lint, but this is hardly to be imitated, unless there is much oozing of blood, from the danger of erysipelatous inflammation which any irritating substance is likely to produce in so extensive a wound. — W.]

(c.) FRONTAL SINUSES. — The following particulars of a case of carcinoma of these cavities are abridged from the original history by Desgranges, recently published in *L'Expérience* by the learned editor M. Dezeimeris¹. A man, aged twenty-five, presented himself at a provincial hospital with a tumor situated at the root of the nose. Two years before he had confluent variola, attended with violent cephalalgia from which he was never afterwards wholly freed. He suffered besides from stuffing in the nostrils, frequent sneezing, and desire to clear the nose. The frontal pain increasing, occasionally assumed the lancinating character; and at the end of fifteen months the bone, immediately above the root of the nose, appeared to bulge out. This prominence gradually increased, was at first hard and insensible, but subsequently became somewhat tender. Impaired olfaction, severe itching in the nares, with puriform discharge now supervened. On his admission, the external tumor was as large as a hen's egg, the

¹ No. 36, Avril, 1838.

investing integuments engorged, œdematous, and slightly red. The bone covering the tumor seemed exceedingly thin, and obscure fluctuation perceptible. A "malignant fever" carried off the patient fifteen days after his admission. The prominent part of the bone was found to be extremely thin, cracked, and ready to separate into fragments. On removing this lamella—the anterior wall of the frontal sinuses—a tumor springing from the lining membrane of those cavities presented itself, somewhat flattened on its posterior, convex on its anterior surface. Smooth and reddish externally, a section of this growth exhibited superiorly a solid, firm, sarcomatous or scirrhus tissue, very slightly tinged with red,—inferiorly a humid, redder, and softer substance, as it were decomposed and covered with a sort of purulent mucilage; the latter could not be removed without scraping away some of the tumor, which then bled. The septum of the sinuses had totally disappeared; the size of these cavities was greater than natural; and the opening, communicating with the ethmoid cells, widened and plugged with engorged pituitary membrane, apparently inflamed and purulent. The internal plate of the frontal bone presented its natural aspect; the posterior lamella of the sinuses of ordinary thickness was of red brown color, as in the bones of young subjects. The corresponding dura mater adhered but slightly to the cranium; towards the crista galli appeared varicose vessels which bled abundantly. The venous sinuses, as also the vessels of the dura mater and cerebral substance, were likewise engorged with blood.

The characters of an encephaloid tumor partially softened may be recognised in these details. The progress of the disease was closely similar to that of perforating cranial cancer; and the healthy state of the posterior wall shows that extirpation of the tumor might have been undertaken with reasonable prospect of success.

(D.) SPHENOID SINUSES. — Dr. Carswell¹ has given an engraving of an encephaloid growth originating in this situation, and protruding through the substance of the bone into the cavity of the cranium. Dr. Bright² speaks of a similar case; the patient had suffered from facial neuralgia.

(E.) LARYNX. — Examples of cancer of this organ, especially of the primary kind, are exceedingly rare. The following abridgement of a narrative by M. Louis of such a case consequently possesses no ordinary interest.

In a subject dying with extensive pulmonary emphysema and hypertrophy of the heart, "the epiglottis was somewhat thrown to the left side, but healthy. Immediately underneath it appeared a mass of white, hard, firm matter, creaking when divided with the scalpel, shining, without distinct structure, extending to the right and backwards between the thyroid and cricoid cartilages, not protruding above the superior border of the former, and very little beyond the posterior edge of the arytaenoid, which was itself transformed into similar cancerous matter, without being, at least in its entire extent, continuous with the rest of the diseased formation. The cancerous mass, of a wedgelike shape, measured three-quarters of an inch in thickness posteriorly, somewhat less in front. Of creamy consistence in its interior, it lessened the calibre of the larynx materially on the right side, where the chordæ vocales were destroyed; a diminution increased by another similar but much smaller mass, placed under the left inferior chorda vocalis, which was non-ulcerated. The thyroid cartilage was healthy, the cricoid ossified throughout; the arytaenoid muscle terminated on the right in the cancerous substance. The mucous membrane of the trachea

¹ Element. Illustrations, Carcinoma, Fasc. II. Pl. II. fig. 7.

² Reports of Med. Cases, vol. ii. p. 506.

was pale and of normal thickness and consistence; the œsophagus healthy." No other organ in the body contained cancerous matter. Nine months before the patient's death the voice was affected without being completely lost; for the last four months, at least, he suffered from permanent aphonia. There was but little cough, but this had a clanging character; the patient never complained of pain in the larynx, and upon two occasions only, when some drink escaped through the nostrils, did he suffer from dysphagia. There was no irregularity noticed in the form of the neck; the patient was gay, but emaciated, and the skin of an earthy tint. The existence of the disease does not appear to have been ascertained during life.

To Professor Albers, of Bonn, the profession is likewise indebted for two well related examples of primary encephaloid of this organ. But M. Trousseau has contributed a case more directly interesting to the surgeon than either of those referred to, as in this instance the medical attendants were obliged to have recourse to tracheotomy to avert imminent suffocation. The subject of the operation, a woman aged thirty-two, continued well for five months after its performance; the canula being during this period retained in the trachea, and the patient enabled, by closing the orifice of the instrument, to speak with very efficient loudness. Nine months after, a tumor, detected at the left inferior part of the larynx at the time of the operation, suddenly acquired a great increase of bulk, and sprouting out between the canula and the upper edge of the wound, soon ulcerated and became the seat of frequent hæmorrhage. Pleurisy with effusion supervened, and the patient died hectic. A multitude of tumors of various sizes, in bunches or isolated, almost filled the larynx, covering the epiglottis and part of the trachea, and, protruding externally, formed a mass as large as a moderate-sized apple; these were of irregular form, and covered with livid, attenuated, and

ulcerated skin: numerous similar tumors appeared in the adjoining cellular tissue. The laryngeal mucous membrane between the tumors was ulcerated and fungous; the left arytænoid ligament converted into the diseased matter; the cartilages, broken into fragments, implanted in the middle of the tumors. The latter creaked under the scalpel when divided, were firm, and of the color of the substance of an Indian chesnut. They possessed the humidity of encephaloid, though the smoothness and the color of their divided surface assimilated them more to tubercle. The others were softened and converted into yellowish pulp. M. Cruveilhier pronounced the disease to be of cancerous nature.

BIBLIOGRAPHY. — *Morgagni*, De Sed. et Caus. Morb. Ep. 28, cap. 9. *Pelletan*, Clin. Chirurg. t. i. p. 15. 1810. (This was in all probability a fibrous tumor, though described as scirrhus.) *Albers*, Ueber durchbohrende Geschwüre der Speiseröhre und der Luftwegen, in Gräfe & Walther's Journal, bd. xix. s. 527. 1834. The same in the same, bd. xxi. s. 527. 1834. *Louis*, in Mém. de la Soc. Méd. d'Observation. t. i. p. 169. Paris, 1837. *Trousseau & Belloc*, Traité de la Phthisie Laryngée, p. 132. Paris, 1837.

IX. — Genital Organs.

1. MALE. (A.) PENIS. — Cancer of the penis is almost invariably of the schirrous species, and in the vast majority of cases commences in the glans or prepuce.

Scirrhus may originate as a warty excrescence, either on the surface of the prepuce, the glans, or the frænum; or infiltrate the glans, and convert that part into an indurated mass; or first attract notice, as a "pimple" which discharges an excoriating fluid, scabs and breaks out afresh, while ulcerations and induration advance at its base: or venereal ulcers may become complicated by carcinomatous deposition and fungate in the same manner as primary

cancer. Encephaloid, which has very rarely been observed in this organ, exhibited itself in a case treated by M. Buret as a tumor, of the size of a pigeon's egg, situated between the fibrous membrane and skin of the dorsum; the interior of the growth had exactly the appearance of semiputrid infant brain.

M. Buret states that the fibrous sheath of the corpora cavernosa, and the erectile tissue of the urethra, may be the primary seat of the disease; in whatever situation it originates it commonly soon involves the rest of the organ. Months may, however, pass over, before induration, beginning in the glans, spreads to the corpora cavernosa; this is, besides, slow in passing into the ulcerated stage, sometimes producing a sensation of weight, slight aching pain, and difficulty in micturition, for a number of months, or even years, before this change occurs. The progress of the warty excrescence is usually more rapid. The discharge from the ulcerated surface is abundant, and the cauliflower fungating masses produced sometimes reach a large size, forming with the swollen glans and prepuce a mass as big as the clenched hand. According to M. Buret, when the disease is seated in the skin, prepuce, or cellular tissue of the penis, the inguinal glands are first engorged; on the contrary, the pelvic suffer earliest, when the more deeply seated parts are affected. The constitutional symptoms are those characteristic of cancer. In rare cases the disease becomes stationary in the penis, and the patient perishes from the active progress of consecutive cancers in the glands and viscera.

Several practical surgeons, among others Hey, Boyer, Roux, Travers, and Bégin, coincide in remarking on the frequency of phymosis, either congenital or acquired, in individuals laboring under cancer of the penis. The confinement of the smegma preputii, and of drops of urine thus induced, is supposed to be the cause of the disease;

whether the explanation be correct or not, the fact itself is of much practical importance, and almost a sufficient reason for circumcising individuals thus formed or affected. Cancer, however, occurs in subjects differently conformed; we remember to have observed it in a person whose glans had been uncovered from childhood, and three out of twelve of the patients treated by Hey were free from phymosis; the disease is most common in adults, and more especially in subjects of rather advanced age¹.

M. Buret has twice observed a peculiar indurated state of the lateral anterior half of the penis; the tissue thus affected is dense, firm, indolent, and diminished in size, and the organ becomes curved in that direction during erection. This condition is perfectly distinct, he conceives, from scirrhus hardening, but he does not state the means of distinguishing them.

Removal of the disease affords the only chance of saving a patient affected with cancer of the penis, and few surgeons admit that mere excision of the actually cancerous part is sufficient. Mr. Travers "holds it to be quite useless to remove the prepuce alone in any case of malignant sore or excrescence, however the glans may be free from ulceration; and M. Bégin expresses himself in a similar strain. M. Lisfranc, however, professes different notions: having dissected penises, removed as extensively carcinomatous, in which he ascertained that the disease was only superficial, and did not involve the corpora cavernosa, and

¹ Like other organs, the penis is said to become the seat of cancer occasionally, through the immediate action of common irritation; but when this is the case the subject must be strongly predisposed to the disease: such, doubtless, was the constitutional state of the unfortunate "gentilhomme dont le prépuce avait été morcelé par un cadenas d'or imposé par la jalousie d'une Italienne, et dont la verge, devenue par suite cancéreuse, fut amputée par Dupuytren." See Legros in *L'Expérience*, No. 58. Août, 1838.

further reflecting on the power of the albugineous tissues to resist cancerous infiltration, this surgeon decided upon trying whether amputation of the organ (the effects of which on the *morale* of the sufferer he describes in piteous but probably not exaggerated terms) might not be safely given up for excision of the affected parts. Here we have, to a certain extent, a revival of principles taught by Callisen¹. In order to ascertain the depth of the disease with certainty, M. Lisfranc recommends the diseased mass to be cautiously divided through the centre down to the fibrous sheath; if this be healthy the disease may be excised; if not, amputation must at once be performed. To this mode of procedure it may be objected that, although the fibrous tissue appears healthy, it may really contain germina of the disease; that the operation is longer, and the incision useless, if amputation be eventually required. The real value of the first objection — though, from what we have already seen, specious even in this case — is to be decided by experience; as to the others, there are few patients who would not willingly submit to a little additional pain for the chance of retaining the implicated organ. But under all modes of operation the prognosis is unfavorable. Mr. Travers assures us that “if the penis be amputated at some distance beyond the hardened part, and before the disease has existed long, the patient may escape a return of it; but this is a rare instance of good fortune. Slight symptomatic enlargement of the glands in the groin should not be accounted a bar to the operation, and, on the other hand, the absence of all glandular affection is no security against its return and fatal termination in three months.” Some forms of the disease are, however, according to the same surgeon, more favorable for operation than others; the “irritable pimple,” either of the glans or pre-

¹ Syst. Chir. Hod. p. 420. 1800.

puce, breaking into hard-based, spreading, and fungating ulcer, is more likely to be followed by reproduction than the form commencing as a warty excrescence.

Amputation practised immediately behind, or even at a certain distance from the glans, does not render the organ altogether unfit for the performance of its functions. In evidence of this M. Buret quotes Scultetus: in a case of carcinoma treated by this surgeon, "*maximâ penis portione, præsentibus magistris J. Pasboom et M. Klonkhuyzen, exsectâ, vulnus consolidatum nec urinandi nec seminandi ullam fecit remoram, et diffractâ hastâ ipsam ausus est (æger) aggredi Helenam.*" Reproduction of the disease may either occur in the stump, in the inguinal glands, or in internal organs, and either in the scirrhus or encephaloid forms.

[If it should be determined to adopt the method of Lisfranc, and attempt to save the body of the organ, the following is the method according to Malgaigne, in which he proceeds. An incision is made on the dorsal part of the penis and parallel to its axis through the carcinomatous growth in its whole extent: this incision should be made with a convex bistoury held in the fifth position, very deliberately, and with slight touches of the knife. A sponge answers to cleanse the wound, and we come finally upon the fibrous envelop of the corpora cavernosa. If it is found healthy, the cancerous part is carefully dissected out, and the body of the penis preserved; if it is diseased in any part, as is ordinarily the case in the neighborhood of the cancerous ulcerations, the suspected portions should be seized with hooked forceps, and excised with scissors curved on the flat side: it may be found necessary to scrape with the blade of the bistoury, carried in a direction perpendicularly to the axis of the organ, any part which may have a suspicious character. Finally, if it should be discovered that the disease had too far advanced, we should at once proceed to amputate.

The amputation of the penis is thus performed. The diseased parts being enveloped in a compress, the surgeon seizes the organ behind the glans and prepuce, and compresses the skin forcibly against the corpora cavernosa; an assistant should be required to take hold of the penis near its root, so as to give the skin a proper degree of tension. The amputation may now be made with one cut of a long bistoury, or amputating knife, the urethra, corpora cavernosa, and skin being all divided at the same level. In case the amputation is performed near the root of the organ, it may be preferable to preserve a portion of the integuments, the division of the skin should therefore be made first, and being allowed to retract the incisions through the deep-seated parts may then be completed. Great care should be taken, when amputating the penis near its base, not to draw too forcibly on the skin, as in some cases the neighboring integuments of the scrotum are drawn out, and included in the incisions.

As soon as the diseased part is removed, we should proceed to stop the bleeding vessels. Two large arteries on the dorsum of the corpora cavernosa usually require ligatures, and also the arteries of the corpora cavernosa themselves. Sometimes the blood proceeds from the whole cut surface of the spongy portion of these organs, in which case, if compression does not succeed in arresting it, it may be lifted up with a forceps and included in a ligature. M. Hey has recommended, that a narrow bandage, or tape should be tied tightly around the root of the organ, to prevent the retraction which is so likely to take place. These means will, if effectually used, give us the complete control of the divided parts, until we are prepared to apply the ligatures, and prevent the danger from the formidable hæmorrhage which so frequently arises when the corpora cavernosa are drawn back under the pubis. A gum elastic catheter should now be placed in the urethra; this

serves not only to prevent the contact of the urine with the wound, which is a source of much pain to the patient, but it also prevents the contraction of the orifice of the canal. The wound always heals by granulation, any attempts at union of the skin to the edges of the corpora cavernosa being frustrated. In those cases where the penis has been amputated very near its root, the patient has some difficulty in passing the water in a stream, it running down over the thighs and scrotum — in these cases Ambrose Paré has recommended a small conical canula of wood, or metal, which is placed over the stump, and serves to direct the stream of water. — W.]

Buret, Journ. Hebdom. t. i. p. 377. 1823. *Lisfranc*, Mém. sur les Cancers superficiels qu'on croyait profonds; Gaz. Méd. de Paris, p. 249. 1830.

(B.) PROSTATE GLAND. — True scirrhus is of singularly rare occurrence in the prostate. Mr. Travers has found the organ occupied by a small tumor, possessing all the characters of scirrhus; and met with instances in which the stony hardness and enlargement of the gland, the bloody seminal discharge, and the peculiar pains felt in the thighs and elsewhere, seemed to leave no doubt of its being the seat of that form of cancer. Sir B. Brodie relates two cases of presumed scirrhus of this organ. “There was a constant and severe pain referred to the neck of the bladder, which was not relieved on the urine being drawn off. The urine deposited a considerable quantity of adhesive mucus, and was of an ammoniacal odor. [This is mere evidence of the existence of chronic cystitis.] The prostate was found on examination to be much enlarged, and of a stony hardness. The patient complained of excruciating pains in different parts of the body, which could be compared to nothing except the pains under which persons afflicted with carcinoma occasionally labor. He sub-

sequently suddenly became hemiplegic, and died in a fortnight." The last circumstance is exactly similar to what was observed in a case related from the same author, under the head of mammary cancer, and depended, as he conjectures, on the same cause¹.

Mr. Langstaff² has described an encephaloid tumor, as large as an orange, springing from the prostate, and chiefly from its "third lobe;" it had occasioned absorption of as much of the mucous coat of the bladder, as allowed of its getting into the cavity of that organ, had extended laterally, and completely plugged up the orifices of both ureters; the urethra was nearly closed also. The patient, aged 68, had suffered under vesical symptoms for upwards of five years, and for the last six months with most excruciating pain in the regions of the kidneys and bladder; he voided his urine in drops, or in a very small stream, had pain in the rectum, and was costive. The existence of enlargement of the prostate was ascertained, by examination through the rectum: one of the smallest sized bougies passed with great difficulty. The patient suffered from continual hæmaturia towards the close: death was immediately caused by rupture of the right ureter and effusion of three pints of urine and blood behind the peritoneum. The liver and lung also contained encephaloid growths.

In the following case, observed by Mr. Stafford, the disease proved fatal from its influence on the urinary functions before the occurrence of ulceration. A boy, *ætat.* 5, having been for three or four months subject to "irritable bladder," voiding his urine very frequently, and remarkable for the tumid state of his belly, was brought to the Marylebone Infirmary with complete retention, complaining of no pain, but restless and irritable, with an anxious and de-

¹ Dis. of Urinary Organs, Ed. 2, p. 161.

² Loc. cit.

pressed countenance, furred tongue, and considerable fever. A small elastic gum catheter was passed without difficulty, and twenty-five ounces of urine of natural color drawn off. The power of voiding the urine naturally being totally lost, the catheter was used twice daily, and at length, from the rapidity with which the urine accumulated, left in the bladder altogether. The boy gradually sank, and died on the eighth day after admission. The prostate was found to be of globular form and as bulky as the largest walnut; the so-called third lobe to be nearly as large as a small hazel-nut (about the normal size of the entire gland in a subject of this age); the section of one lateral lobe exhibited the color, consistence, and texture of encephaloid, in one part apparently mixed with melanotic matter. The abdominal and thoracic viscera were healthy, nor was any other cancer discovered¹.

(C.) TESTIS AND EPIDIDYMIS. — [There are two forms of cancerous disease met with in the testicle, viz. the encephaloid or what has been called fungoid disease, and scirrhus, the latter however is rare, and presents appearances different from the affection as it appears in other parts of the body.

The fungoid disease of the testicle usually commences with a hardness, attended by a dull pain in the organ, and more or less disturbance of the general system, most of the subjects of this affection being of a bad constitution. The immediate cause is generally attributed to an injury of the part. As the disease progresses the swelling becomes softer, and there is a deposit of fluid into the tunica vaginalis, which is likely to make us confound it at first with hydrocele, unless attention be given to the previous history of the case. The skin now becomes inflamed, and adherent to the testicle, and finally from ulceration, or the imprudent

¹ Med. Chir. Trans. vol. xxii. p. 218. 1839.

use of the knife, a fungus shoots out. The Epididymis usually becomes involved in the disease before ulceration takes place, the spermatic cord enlarged and indurated, and the glands in the groin, more or less affected. After death, a great mass of disease is discovered in the abdomen, behind the peritoneum in the course of the lymphatic vessels.

The only remedy for this affection is extirpation; even this promises less chances to the patient than in almost any other surgical affection, and by some writers is decried as useless and always followed by a return of the disease¹. Sir Astley Cooper recommends that a constitutional treatment should be employed, by a mild mercurial course, at the same time with the surgical operation. In order to be of any service it is of course necessary that the operation should be early performed, as the disease, as soon as it manifests its malignant nature, usually terminates fatally in from six to twelve months.

The scirrhus affection of the testicle has been but rarely met with. Sir Astley Cooper has seen but a single example. In those cases which have been supposed to be scirrhus, the testicle is quite hard, has an irregular and knotted shape, and generally surrounded by water. In other respects the disease follows the same course as in other parts of the body. The general health is impaired. The glands of the groin are enlarged and the lower extremity of the affected side swollen, and infiltrated with serum. As with the fungoid disease the only hopes of recovery are by having recourse to amputation of the organ. The danger of delay for the trial of remedies being, however, less in this than in the former disease.

¹ Dr. Hayward informs me, that he has lately met with a patient in the enjoyment of perfect health, from whom he removed a fungoid testicle fifteen years since; and that a second patient who had been four years before operated on for the same disease, still remain free from any return of it.

Operation for Castration. The patient should be placed in the recumbent posture on a table, his hips a little elevated by a folded blanket, or pillow. The hair of the pubes should be shaved, both to facilitate the use of the knife, and for the more convenient application of the dressings. The tumor being firmly held in the left hand of the surgeon, is to be drawn down so as to make the skin over it sufficiently tense. An incision should be made from over, or a little above the external inguinal ring to the lower part of the scrotum; the dissection should then be prosecuted until the spermatic cord and testicle are fully exposed. Sir Astley Cooper advises that the cord should be dissected out and divided, before making the dissection of the testicle, both as facilitating the operation, and saving much pain to the patient; so far as our experience goes, the time of the operation is rather increased, than diminished by this preliminary step; the French surgeons have always adopted the former plan. Before the division of the spermatic cord is made, an assistant should take a strong hold on it, with a hooked forceps, in order to prevent its retraction towards the abdomen, which accident is always to the utmost embarrassing to the surgeon on account of the hæmorrhage, plugging being rarely followed by success; in this case the only resource would be to pursue the dissection up the inguinal canal, until the bleeding vessels are discovered. The diseased mass being removed, the next point is to secure the arteries. Those of the cord are to be tied first, followed by those of the scrotum, which are usually very numerous. After waiting until all danger of hæmorrhage has passed, the skin of the scrotum is to be brought together by two or three sutures, and a simple cold water dressing applied to the wound. — W.]

2. FEMALE. (A.) OVARIES.—Cancer of the ovary may either exist as an extension of the disease from the uterus; originate independently of, but subsequently to, the formation of cancer in the latter organ; appear as a primary affection, or consecutively to the growth of carcinoma in distant organs. Its occurrence under the latter circumstances is regarded by Cruveilhier, as we have already mentioned, as extremely rare. Without being able to state the frequency of ovarian cancer with any precision, we are justified in affirming that it is far from uncommon; and that while Bayle has fallen into a most singular error in almost questioning its occurrence, Boivin, Dugès, and Dr. F. Churchill, exaggerate materially in considering it more frequent than carcinoma of the mammæ.

Scirrhus and encephaloid of the tuberiform and infiltrated kinds occur in this organ; but we are not aware that true alveolar colloid cancer has yet been discovered in it. The carcinomatous affection may be the sole disease present: when this is the case, and when it assumes the tuberiform character, the substance of the ovary may sometimes be found on the external surface of the diseased growth in an atrophous state, or of the natural dimensions: when the morbid matter is infiltrated through the ovarian tissue, the vesicles of Graeff may present the natural appearance¹: occasionally, as in one of Dr. Bright's cases², the deposition seems to occur in the wall of one of these vesicles. In another class of cases the carcinomatous matter, originating in the walls of multilocular, or much more rarely of unilocular cyst, forms a complication of pre-existing disease.

The different varieties of scirrhus and encephaloid exhibit themselves in this organ; those of the latter more frequently than of the former. Bistre-colored, or true

¹ Bouillaud.

² Guy's Hosp. Reports, vol. iii. p. 179. 1838.

melanotic deposition, is not uncommonly superadded. When formed in the walls of cysts encephaloid frequently co-exists with fibrous, cartilaginous, calcareous, or ossiform transformation of those walls; and numerous cases, in which the diseased formation consisted simply of cysts, of which the walls had been converted into fibrous tissue, have been erroneously described as scirrhus of the ovary.

Encephaloid growths vary in size in this organ from that of a pin's head, as we have detected them under the serous lining of cysts, to that of the foetal head, or upwards. They are rarely, however, observed to attain very large dimensions here, unless when developed in the walls of cysts; under these circumstances, the entire formation has been known to weigh fifty-six, sixty, and seventy-five pounds, or even more. Dr. Warren describes the removal of a "scirrhus ovarium, of almost cartilaginous hardness, containing neither cavity nor fluid, which weighed about twenty-five pounds;" it may be objected to this statement, however, that no proof is given of the truly scirrhus character of the growth.

The disease is usually confined to one ovary, though it not unfrequently affects both. Conception may occur repeatedly in the former case, as is shown by numerous examples of the fact on record. Mr. Hewlett has related the case of a female delivered at the full time, though both ovaries were the seat of extensive encephaloid disease: it seems doubtful whether the disease existed in both organs at the period of impregnation (in which case the læsion of structure must have been limited on one side), or was subsequently developed; the latter, judging from the history of the case and the species of the cancer, was most probably the fact¹.

Dr. Seymour conceives, he has ascertained, that scirrhus of the ovary rarely softens, and refers to a preparation in

¹ Med. Chir. Trans. vol. xvii. p. 226. 1832.

the College of Physicians as a very singular specimen of such change¹. Encephaloid of this organ is not thus distinguished.

The morbid mass contracts adhesions with surrounding parts in many, but in what exact proportion of cases, is yet matter for inquiry. If these adhesions occur in an early stage of its growth, they connect it with the uterus, rectum, or pelvic peritoneum; if at a later period, with the omentum, colon, small intestine, or abdominal portion of the serous membrane. The Fallopian tubes in some instances continue free, but more ordinarily become firmly united with the tumor, round which they twine, undergoing a degree of elongation corresponding to its increasing dimensions.

The local symptoms of ovarium carcinoma are mechanical and functional. The former follow precisely the same course as those of ovarian tumors in general, changing with their size and position in the pelvis or abdominal cavity.

The condition of the catamenia varies: they may be irregular, absent, or, as is observed in comparatively rare instances, undergo no change from the healthy state. Lancinating pain is very far from a common attendant on carcinoma in this situation; nor is it possible, upon the foundation of cases hitherto published, to point out any series of symptoms that can be called characteristic of cancer of these organs: that is, of symptoms whereby simple carcinomatous tumors may be invariably distinguished from other diseased enlargements of these parts, or whereby the period, at which deposition of cancerous matter in the walls of encysted formations arises, may be announced: yet we are far from believing that by patient, minute, and extensive observation of ovarian disease, such characteristic symptoms might not be found to exist: however, until such observation be undertaken, we can scarcely object with justice to the habit of practical writers, who, in spite

¹ On Diseases of the Ovaries. Lond.

of the evidences of pathological anatomy, continue to group encysted growths and true carcinomatous tumors under the same head of "malignant disease" of the ovaries. The cancerous cachexia is slow in occurring and ill marked.

With respect to the state of other organs, we have already mentioned that Cruveilhier regards the secondary development of cancer in the ovary, unless when a sequence of its existence in the uterus, as singularly rare. It has, however, been found co-existing with cancerous disease in various organs; and examples of multiple development, under these circumstances, may be found in numbers in Dr. Bright's essay already referred to.

Death, in cases of ovarian cancer, more commonly depends upon the changes occurring in, or on some effects produced by, the encysted formations to which the carcinoma is usually superadded, than on modifications having their seat in the latter. The fatal event appears in many instances the result of progressive exhaustion and sinking of the vital powers, no particular morbid change being discovered to account for it; but in the majority of cases it is immediately brought about by inflammatory action in the cyst itself or in the peritoneum. The inflammation of the serous membrane originates sometimes without any evident cause: more commonly from the escape of the contents of a cyst into its cavity, the effect either of natural rupture (which may be spontaneous or produced by a fall or blow), or of the operation of paracentesis. In some very rare instances — such a case is reported by Dr. Bright — effusion of cancerous matter into the peritoneum has been observed. The escape of the encysted fluids may take place into the intestines, and the diminution of the tumor coadvance with diarrhœa¹, or into the vagina².

¹ Legallois, Bright, &c.

² Munro

Of the causes of ovarian cancer nothing is known: much hypothetical matter has been written on the influence of gestation, abortion, suppression of the lochia, &c.; the unsatisfactory character of this may be ascertained by perusing the published histories of some dozen patients. Boivin and Dugès affirm that it is most common in single persons¹: this too may be doubted.

The diagnosis of ovarian enlargement is often exceedingly obscure; let us suppose, however, that an abdominal tumor has, by the rules laid down², been distinctly ascertained to exist in that organ, and not in the substance of, or in connexion with, the uterus, mesentery, intestines, kidneys, spleen, or liver,—that the female is neither pregnant nor affected with ascites—the *nature* of the morbid development remains to be decided. If well-marked cancerous disease coexist in some other organ with the ovarian tumor, the latter is probably carcinomatous: if no other part is apparently carcinomatous, and the cancerous cachexia is established, we are entitled to infer that the affection of the ovary is of this character, with a degree of confidence proportional to the surety of our diagnosis in respect of other parts. But both of these general guides may be absent, or may fail us: we must then depend on the local characters of the disease.—*Fibrous tumors of the ovary* may, when large, be distinguished from scirrhus by their size; from encephaloid, by their hardness, inferior elasticity, smoother non-lobulated surface, and uniform consistence in every part. The condition of the patient's health will, in some instances, facilitate

¹ On this Capuron, who considers the statement to be correct, observes: "Mais à quoi tient cette différence? Est-ce à une continence trop sévère, qui n'entre point dans les vues de la Nature, ou bien à la dissolution ou au dérèglement des mœurs qui n'a lieu que trop souvent hors du mariage?"

² Article Ovary, Cycl. Pract. Surg.

the distinction. — *Unilocular cysts* are non-lobulated ; they usually contain a serous fluid, in which case the fluctuation of this will readily prove that the mass of the tumor does not consist of cancerous matter ; and even when the contents are of a gelatinous character, the phenomenon is sufficiently well marked to prevent mistake. The constitution suffers little in this disease. — *Multilocular cysts*, on the contrary, either from the consistence of their contents (firm jelly-like matter, ætheroma, acephalocysts, pilous and fatty substance,) or from the non-communication of their cells, rarely give rise to more than very obscure fluctuation, which may almost be confounded with the elastic doughiness of encephaloid ; careful examination will, however, enable the observer to avoid this error. — It is not enough, however, to be able to affirm that the entire mass of the tumor is not composed of cancer — an extremely rare occurrence ; we require to ascertain whether, and to what extent, encysted growths are complicated with carcinomatous deposition in their walls. In certain cases this may be done by the detection, both by palpation and percussion, of irregular indurated masses distinguished by their greater softness from the remainder of the tumor ; when the cysts are exceedingly tense from thorough repletion with fluid, this sign of lobulation may not be ascertainable : in this state of things evacuation of the fluid by paracentesis will remove this difficulty in the way of the diagnosis. Nevertheless, the discovery of these lobulated masses is not a certain sign of cancerous formation ; bunches of subcysts, with gelatinous or albuminous contents (we here allude to their outward appearance), aggregated in the parietes of larger cysts, give rise to a precisely similar sensation. — When the “hydatid fremitus” of M. Piorry exists in a marked manner, the presence of acephalocysts may be safely announced ; but the recognition of this sign is far from easy. — A very rapid course of the disease furnishes one of the best proofs of encephaloid complication.

On the general principles of medical treatment of ovarian cancer, no particular point requires notice. It is important to remember that giving exit by puncture to the fluid contents of cysts of the ovary, complicated with encephaloid deposition in their walls, must, in the same manner as in the mamma, afford mischievous facility for the development of the cancerous matter. This distinctly appears to have been the result of the operation in a case related by Dr. Seymour¹. A tumor of this kind was punctured with, as is usual, temporary amelioration of the symptoms; but the patient was subsequently unable to pass a month without a repetition of the process, "which each succeeding time became more difficult, from the *increase of the solid tumors* in the abdomen." It is impossible to separate the consideration either of paracentesis or extirpation in cancerous cases, and in those in which the ovarian tumor is uncomplicated with such disease; both these important operations are treated of in the article Ovary, Cycl. Pract. Surg.: under this head the bibliography of the subject will also be found. It may be right to anticipate our intended observations so far as to state, that if marked cancerous disease be present, the result of extirpation must, in the language of Dr. Bright, be "useless agony to the patient, and deep mortification to the operator."

(B.) FALLOPIAN TUBES.—The Fallopian tubes are sometimes involved in carcinoma, spreading from the uterus. Boivin and Dugès have never seen them primarily affected; Dr. R. Lee, however, affirms that the disease may originate in this situation.

(C.) VAGINA.—The deep-seated portion of the vagina is, in rare instances, found to be the seat of cancerous disease, independently of extension from the uterus or rectum. Mr. Ferrall² recently exhibited a specimen of cancer, apparently

¹ Op. cit. p. 63.

² Dub. Journal, p. 335. Nov. 1839.

of this kind, to the Pathological Society of Dublin. The vagina was the chief seat of ulceration, the uterus being healthy with the exception of the os tincæ, to which the ulcerative process had extended; continuous with the cancerous surface was a large encephaloid tumor, which penetrated the roof of the vagina and entered the bladder, forming a large fungous mass in its interior. The patient died of exhaustion from repeated vaginal hæmorrhage.

(D.) CLITORIS AND NYMPHÆ. — These appendages may become the seat of cancer either primarily; by continuity with deeply-seated parts; or consecutively to the development of carcinoma of the uterus. Boiven and Dugès relate the case of a female, ætat. 34, in whom “the clitoris, of the size of the little finger, had acquired this volume from the serous infiltration of its external investment; its proper tissue was scirrhus.” Mr. Travers has also “known the clitoris the subject of scirrhus ulceration, and freely amputated.” — Schoenfeld¹ removed the clitoris and nymphæ, forming a tumor weighing three ounces; the mass was not of fibrous texture, but formed of a whitish substance, smooth, of almost cartilaginous hardness, and traversed by a multitude of capillaries visible under a lens. This was probably firm encephaloid. A tumor, consisting of a white softish clustered mass, as large as the clenched hand, was once found by Boivin and Dugès suspended to the clitoris and nymphæ, by a pedicle of the dimensions of the little finger. After death its component lobules were ascertained to possess the appearance and consistence of encephaloid. One of the most remarkable cases of this kind on record is described by Mr. Brayne². The tumor in this instance weighed in situ (as nearly as could be ascertained) eleven pounds; and its external appearance, the frequent and vio-

¹ L'Expérience, Sept. 5, 1838.

² Prov. Med. & Surg. Trans. vol. iv. p. 369. 1839.

lent hæmorrhages and lancinating pains of which it was the seat, as well as the general course of the symptoms to which it gave rise, leave little doubt as to its carcinomatous nature, though, as the narrative does not extend to the patient's death, we are unaware of the precise characters of its component tissue. A very interesting example of carcinoma of the external genitals, which coexisted with pregnancy and with cancerous products in numerous other parts, has been related by Dr. Ashwell. Premature artificial labor was brought on in this case¹.

Excision of the diseased parts should be performed as early as possible. The dissection may, if necessary, be pursued as far as the insertion of the corpora cavernosa into the rami of the ischia.

(E.) LABIA AND VULVA. — Dr. Stedman² describes a tumor which had been growing for five years in the right labium of a woman of color, was the seat of stinging pain and ulceration, and discharged a very fætid matter. The patient was a good deal reduced. The growth was, on removal, ascertained to weigh twelve ounces and a half, and “to exhibit the true scirrhus character or section.”

The skin of the vulva sometimes gives origin to cancerous excrescences, which run the same course as in other parts of the surface. In certain cases scirrhus infiltration of the skin is so trifling in extent that the disease appears to commence by ulceration. In this case, as Mr. Heming remarks, it is with difficulty distinguished from a venereal sore. “The chief diagnostic symptoms,” says this practitioner, “may perhaps be found in the general affection of the surrounding sebaceous glands, giving the skin an appearance as if studded with tubercles, about the size of split peas.” Inoculation of the secreted fluids might proba-

¹ Guy's Hosp. Rep. vol. ii. p. 247.

² Ed. Med. & Surg. Journ. vol. xxxvii. p. 25.

bly settle the question. In a case of this kind observed by Mr. Heming, "the carcinomatous affection had extended up the vagina to about two thirds of its length; the uterus and ovaria were not at all affected; the liver had in its substance, particularly towards its surface, about twenty small tumors of a carcinomatous appearance, and both kidneys were affected with the same disease¹."

The excision of the diseased parts is usually an operation of extreme simplicity, and, according to Bégín, the greater portion of the external genitals has been removed without entailing serious inconvenience or obstruction of function. But the presence of an intricate and extensive vascular plexus under the vaginal surface renders it a difficult matter in some cases to stop the hæmorrhage which follows: plugging the vagina with lint steeped in some styptic solution, and covering the external parts with compresses similarly imbibed — the whole being retained in situ with a T bandage — is the best mode of arresting it. The bladder should be regularly emptied with the catheter for some time.

Dr. Stedman encompassed the tumor above referred to with two semilunar incisions, and then rapidly dissected it out. Four small arterial branches only required to be tied; the wound was brought together with five stitches of interrupted suture. Five months after, there had been no return of the disease.

X. — *Urinary Organs and Passages.*

(A.) KIDNEYS. — Cancer of the kidney may be either primary or secondary: in the former instance solitary, or

¹ Translation of Boivin and Dugès on Diseases of the Uterus, p. 544. Lond. 1834.

accompanied with scirrhus of the renal lymphatic glands and vessels, or with consecutive carcinoma in distant organs, especially the lungs. According to Rayer, the disease sometimes originates under the influence of, without continuity with, cancer of a neighboring part, especially of the liver and of the descending colon.

Encephaloid is the species by far the most frequently observed in the kidney, and exhibits here its different varieties. The organ is sometimes divided into a number of compartments filled with cancerous detritus, blood, and pus arising from suppuration of their walls; these compartments may be without opening or communicate with the calices.

Of renal scirrhus Mr. Wilson has related a striking example: the tissue of the kidney was converted into "a substance nearly as solid as, and feeling like, softened cartilage, of brownish hue, and intersected by thin white membranous septa." König describes a similar case, and refers to another in the *Ephemerides*. M. Rayer has also met scirrhus thus situated, "with the same appearance as in mammary cancer," and surrounded with encephaloid pulp or in the neighborhood of fibrinous deposits.

Encephaloid matter is found either infiltrated through the renal tissue or accumulated in masses; and, as it is affirmed, almost invariably appears first in the cortical substance, which may be totally destroyed before the tubular has suffered at all. The part of the kidney in which the morbid formation commences is subject to much variety. The masses may protrude into the pelvis, or push the membranous walls of that sac before them, and eventually perforate it: collections of the cancerous matter are frequently found in the renal veins and cavæ, either pure or combined with coagulated fibrine. In the early stages the size of the kidney is little affected; in proportion as the morbid matter accumulates, the gland undergoes corre-

sponding enlargement. In the tuberiform species the intervening renal substance may be healthy, hyperhæmic, inflamed, infiltrated with or containing collections of pus. Both organs are very rarely affected; and we know of no instance in which both were extensively so. The healthy kidney is almost always hypertrophous; the non-cancerous parts of the diseased one are often in a similar condition.

The calices are sometimes obliterated, dilated, and filled with serous fluid, as shown by Cruveilhier¹; a state commonly resulting from pressure of the enlarged lymphatic glands of the hilus. The pelvis, in a case observed by Dr. Bright, was dilated into a huge cyst "containing two pints of a brownish fluid, like coagulated blood of long standing." The fibrous capsule may be exceedingly thickened; the hypertrophy bearing perhaps more particularly on the sub-fibrous cellular membrane described by Rayer². This observer has never seen tuberculous associated with cancerous matter in the kidney; Cruveilhier's statements on this point have already been adverted to. The disease may coexist with renal calculi; in the case just mentioned of Dr. Bright, the pelvis contained a mulberry calculus.

In some instances heavy dull pain confined to the renal region is complained of, or this may be lancinating and shoot in the direction of the ureters or the bladder; in others the pain is rather referred to the anterior part of the abdomen, and none may be felt through the entire course of the disease. Various alterations in the conditions of the urine may be naturally supposed to attend its progress, but these have as yet been scarcely attended to. Hæmaturia, albuminuria, and purulent discharge with the urine have, however, been observed. The former is a symptom of almost invariable occurrence; in fact, we have

¹ Livrais. i.

² Malad. des Reins, t. i. p. 23. 1839.

not met with a single case recorded by writers, in which its absence is established; it may appear as the very first symptom, or supervene, at an advanced period only, occur rarely, or be almost always present in abundance or in small quantity. Albuminuria may arise from the passage of encephaloid matter into the excretory passages¹. When suppuration arises in the substance of the kidney and extends to the calices, or when there is distinct pyelitis (inflammation of the pelvis and calices; Rayer) pus finds its way into the bladder, and may be detected in the urine by the usual re-agents; this is, however, a mere epiphenomenon in the disease, and one more likely to mislead the practitioner than to assist him in its diagnosis. If the morbid deposition have materially enlarged the size of the organ, the resulting tumor may be detected by inspection, palpation, and percussion. Diarrhœa is a very ordinary attendant on the affection, and probably depends upon the irritation produced by the close proximity of the morbid formation to the ascending or descending colon. Œdema of the lower extremities is occasionally observed; when the vena cava is obstructed with cancerous matter, this is an invariable result.

Death sometimes appears to be the result of repeated hæmorrhage; in other instances it may follow rupture of the tumor from a blow, and consequent effusion of blood into the peritoneum²; but patients ordinarily sink gradually under the constitutional effects of the disease, though the peculiar cachexia is not often distinctly marked.

The disease is more frequent in males than in females, as is the case with affections of the urinary system in general. M. Rayer has not met with it in children, and more commonly in persons of advanced age than in adults; Dr.

¹ Christison, *Granular Degeneration of the Kidneys*, p. 40.

² Bright, case X.

Bright, however, speaks of "encephaloid disease of the most remarkable and rapid growth occurring in children of the most tender age."

We can do little more in this place than warn the student against certain errors of diagnosis, which a careless estimate of the symptoms we have enumerated might entail. Albuminuria is common to a multitude of affections, and a careful examination of the constitution of the urine in other respects is required to enable us to refer it to any one of these in particular. If it be accompanied with discharge of encephaloid pulp with the urine, distinguishable by its physical characters, there can be little hesitation as to the cause of the albuminous impregnation; and that it does not originate in the bladder may commonly be inferred from the absence of vesical symptoms, and the freedom with which the contents of that viscus are evacuated. Unfortunately, however, for the facility of diagnosis, patients have been known to suffer from hypogastric pain and other symptoms of diseased bladder, in whom after death this viscus was ascertained to be perfectly sound, while the kidneys presented various lesions, the existence of which had not, from the absence of local symptoms, been even suspected during life. For further particulars we must refer to the works of Dr. Bright, of M. Rayer, of M. Martin Solon¹, and of Dr. Christison.

In the writings of the two former authors, and in the chapter on examination of the kidneys by the ingenious and laborious Professor Piorry², may be found such directions, as the present state of the science admits of, for distinguishing the different kinds of renal tumors, and those from growths originating in other organs.

¹ De l'Albuminurie. Paris, 1838.

² Traité de Diagnostic, t. 2. p. 326. 1837.

BIBLIOGRAPHY :— *Langstaff*, Med. Chir. Trans. vol. viii. p. 293. 1817. *Wilson*, Lect. on Dis. of Urinary Organs, p. 284. 1821. *König*, Pract. Abhand. über die Krankheit. der Nieren, s. 224 & 246. Leipzig, 1826. *Rayer*, Maladies des Reins, Planches, livrais. vii. Paris, 1837. *Bright*, Guy's Hosp. Rep. no. viii. p. 208. April, 1839.

(B.) SUPRA-RENAL CAPSULES. The capsules are not unfrequently similarly affected when the kidney is cancerous; and the right one has been found to have become carcinomatous, apparently under the influence of heterologous growths in the liver. M. Rayer has never seen them affected except under these circumstances¹.

(C.) CALICES, PELVIS, AND URETERS. The excretory apparatus of the kidney is occasionally the seat of cancerous matter. 1. A cancerous growth in the kidney may protrude into these passages in the manner already described. 2. Liquiform cancerous matter effused from the kidney may be found occupying the pelvis and part of the ureter *in transitu* to the bladder. 3. Carcinomatous masses having no connexion with the renal disease may originate in the walls of the pelvis. In such cases the flow of urine secreted by the still healthy parts of the kidney is obstructed, and the walls of the pelvis present the columnar appearance so common in the bladder under analogous circumstances; a figure illustrating this has been given by M. Rayer². The inferior extremities of the ureters are often affected in cancerous diseases of the bladder, either primary or consecutive to similar disorganization in the uterus; but we have met with no example of original development of this product in them.

(D.) BLADDER. Carcinoma of the bladder is probably far from being so uncommon an affection, as the general statements of various writers would lead us to believe.

¹ L'Expérience, Nov. 10, 1837.

² Plate xlv. fig. 3.

Many growths included by writers under the vague term "fungus" seem to have been in reality, as attentive study of their anatomical characters and symptoms will show, either composed of purely encephaloid or scirrhus structure, or complicated with deposition of the former. Singularly enough, even the eminent M. Civiale, who inclines to the opinion here hazarded, contributes by his arrangement of vesical diseases to enforce the prevalent error; for he describes under the head "fungus" a case in which, in the language of the original observer, "the bladder contained four or five carcinomatous tumors of various sizes"; and another in which the morbid product was "pulpy, whitish, and cerebriform¹." Formations which in the stomach, for example, would universally be recognised as cancerous, are from mere habit called fungi, when they exhibit themselves in the bladder. In these remarks we refer to primary cancer: of the frequency of the disease as a sequence of uterine carcinoma there is no doubt ever expressed.

Tuberiform, or stratiform scirrhus are comparatively rare; but in a remarkable case detailed by Lallemand, "all the membranes were transformed into a lardaceous scirrhus substance, two inches thick behind the prostate, and extending two or three inches in every direction"; and Mr. S. Cooper has described a distinct example of scirrhus tumor of this organ occurring in a subject, in whom the femur of one side and a rib were infiltrated with the same morbid matter. Sir B. Brodie has never met with a tumor "wholly resembling scirrhus," but has occasionally observed part of a morbid growth to be thus constituted. Tuberiform encephaloid is the condition most commonly assumed by the disease, and here are exhibited the numerous varieties in point of vascularity, &c. elsewhere ob-

¹ *Traité de l'Affection Calculcuse*, pp. 322, 329. Paris, 1838.

served. The surface of the tumor may be smooth, especially before destruction of the mucous coat, irregularly tuberos or botryoidal; and the mass broad-based or pedunculated, studded with or encrusted with calculous substance,—or carcinomatous matter may, as in a case quoted from Ledran by Civiale, insinuate itself between the superficial asperities of a calculus.

The most common seat of cancer is the neck and its vicinity; it also springs from the fundus and anterior or posterior surfaces, but has very rarely been observed on the lateral aspects of the organ. The growth in some instances occupies a very considerable extent of surface; or cauliflower fungous masses, spreading from a narrow basis, may acquire great bulk (of both clenched hands in Desault's case), and almost completely fill the cavity of the viscus. The submucous cellular tunic is commonly the original nidus of the disease. There may be only a single or several tumors.

The mode of progress of the morbid growth is the same as in the other hollow viscera, but it is slow in ulcerating; a fact which has mainly served to keep alive the notion respecting the rarity of vesical cancer, already adverted to. The bladder itself is sometimes contracted, in other instances enlarged; its walls are commonly hypertrophous and exhibit the well-known columnar appearance; the mucous membrane is besides injected, thickened, mammillated, and softened—characteristics of cystitis. The prostate may be perfectly healthy; it was so in Lallemand's case, though immediately contiguous to the diseased formation. Abscesses in the cellular membrane of the adjacent parts sometimes hasten the patient's destruction.

Subjects affected with vesical cancer suffer from frequent inclination to void their urine, which may be passed in a small stream, or even *guttatim*, and from an uneasy sensation usually referred to the neck of the bladder, increasing

after urine has been passed, occasionally becoming exceedingly severe, and shooting to the perinæum and along the urethra to the glans. In the cases observed by Desault and Lallemand there was fixed lancinating pain in the hypogastrium; while Chopart's patient referred his sufferings more particularly to the rectum. It is obvious that the effects of these growths on the excretion of the urine must vary with their precise dimensions and site: if seated close to the orifices of the ureters they may press on and dilate these ducts by causing an accumulation of urine within them (a state attended with almost complete retention), and give rise to pain and other symptoms of irritation in the kidneys: if the internal orifice of the urethra be partially obstructed, the urine is passed (and this is the more ordinary case) in the manner above described; if completely, either from the growing size of the tumor, or separation of pulpy detritus or clots of blood, temporary or persistent retention may arise; or if the growth be pedunculated and therefore partially movable, a full stream may be suddenly and repeatedly arrested (as in a case observed by Velpeau¹), before the contents of the bladder are on each occasion completely evacuated. The urine is usually turbid, and often contains that ropy matter commonly described as "catarrhal" or mucous, but which is now known to be pus modified in character by the action of ammonia². Hæmaturia, in some cases constant, in others of rare occurrence, occasionally hastens the patient's death by its violence and pertinacity. Here, as in other organs, discharge of blood may be the first symptom of carcinoma; it has been observed by Sir B. Brodie before pain or micturition had been complained of. The same experienced surgeon states, that "the blood comes away in large clots of an irregular shape, in which small portions of medullary

¹ Médecine Operat. t. iii. p. 696.

² See Brit. & For. Med. Rev. vol. viii. pp. 130 and 148.

substance are not unfrequently *developed*." The growth may, as in two cases observed by Civiale, produce a distinct tumor in the hypogastrium. In one of these the cancerous disease coexisted with calculus, and as the former appeared "of inconsiderable size and stationary," it was believed to depend on thickening of the walls of the bladder; the patient underwent lithotomy and died: a cancerous mass sprang from the posterior aspect of the viscus. In the other instance, the presence of an irregularly rounded tuberculous mass in the hypogastrium, combined with other local and general signs of cancerous disease, left no doubt as to the nature of the affection; the tumor, originating at the anterior surface of the viscus, had destroyed that portion of its walls, and contracted adhesions with the abdominal parietes. The destruction has in other instances gone further, the fungous mass protruding at the groin or pubis, or perforating the walls of the colon. The neighboring parts are irritated by the presence of the foreign body, and defecation is frequently and with difficulty performed: where the growth has attained considerable bulk, it may, by pressing on the gut, entail obstinate constipation. The existence of a fungous carcinoma in the bladder predisposes, as all other causes interfering with the free excretion of the urine, to the formation of calculi.

Sir B. Brodie has known the disease run its course in eight or ten months, and seen it protracted during seven or eight years. Lallemand is of opinion that "lancinating pain behind the pubis, and emission of morsels of rotten fleshy matter" are the only symptoms by which cancer of the bladder may be recognised with any certainty. Other symptoms will, however, in many cases assist us in the diagnosis of this disease. Suppose there is bloody micturition, and that by the rules laid down in the article HÆMATURIA¹, we have ascertained that the blood comes from the

¹ Cycl. Pract. Surg.

bladder, — if the discharge be exceedingly abundant, or if it occur without apparent cause, such as the jolting of horse or carriage exercise, or the operation of sounding, the inference is that it depends on cancerous rather than calculous disease. If the urine contain encephaloid detritus cognizable by its physical properties, doubt is of course at an end; or if it hold a small quantity only of this in suspension, the albuminous impregnation thus produced may be detected by the usual tests¹.

We have further the evidence of catheterism to guide us in distinguishing the affection, but as past experience shows², the most skilful surgeons have not always been able to distinguish vesical tumors from calculi by this process. Although in some cases, from the extreme softness of the morbid growth, the distinction is comparatively easy, and in others, encephaloid pulp being carried away in the eye of the catheter, error actually impossible, yet in the majority of instances, if the tumor be firm, the sensations received by the operator are not so easily distinguishable from those produced by a calculus, as might, *à priori*, be supposed. In cases of this doubtful character mediate auscultation has been recommended, and as air is a better conductor of sound than water, previous inflation of the bladder suggested; but of the practical utility of this doubts may be entertained. M. Velpeau, and in this he is joined by Mr. Costello, would not trust to the evidence of the stethoscope, where simple catheterism left him undecided as to the nature of the disease. The difficulty of the diagnosis will be greatly increased if a calculus coexist with a cancerous tumor; and if the latter be encrusted with a thick layer of calculous matter (as in a specimen preserved in the Museum of the College of Surgeons, and described and figured by Dr. R. Willis³)

¹ Rayer, *Malad. des Reins*, t. i. p. 184.

² Bédor, *Lancette Franç.* t. viii. no. 148. &c.

³ *On Urinary Diseases*, p. 234.

there are no known means of ascertaining, during life, the nature of the nucleus of this unusual species of calculus.

In sounding or catheterising patients with vesical cancer there are two points to be borne especially in mind: first, that the morbid production sometimes pushes the posterior part of the bladder back, and thus increases to a remarkable extent the length of the prostatic portion of the urethra; secondly, that the introduction of the instrument is followed by much pain and often excites serious hæmorrhage. In illustration of the first point, which has also been noticed by M. Civiale, we may mention that Mr. Costello having on one occasion, as he informs us, provided himself with an unusually long catheter for the purpose of examining a patient affected with this disease, found it impossible, although he carried the instrument as far as practicable into the passages, to reach the posterior wall of the bladder.

Warner¹ long since showed the practicability of removing a tumor from the female bladder by ligature, when the meatus urinarius had previously undergone much dilatation: Lecat invented instruments for performing a similar operation on the male²; Covillard³ cut a man for a tumor the size of a nut and squeezed it with forceps, after which it appears to have suppurated or sloughed away and the patient eventually recovered⁴: M. Civiale has succeeded with ease in removing "fungi," either by tearing them away or by breaking them down. But whatever may be the success of such operations in cases of polypoid vesicular, or erectile tumors, it is difficult to conceive how they could be otherwise than detrimental, where the morbid production is truly cancerous. In these latter cases palliative treatment alone seems warrantable.

¹ Phil. Trans. vol. xlvii. p. 414. 1749.

² Stacke, in Phil. Trans. vol. xlvii. p. 292. 1751.

³ Observ. Iatrochirurgiques, p. 92. Strasb. 1791.

⁴ Lettre à l'Acad. des Sciences, Dec. 22, 1834.

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(E.) URETHRA. 1. *Male*. — M. Lallemand's case of vesical cancer furnishes the only example we are acquainted with of carcinoma originating in the male urethra. The disease was not a prolongation or production from the morbid mass in the bladder, but "a cancerous tumor of the size of a nut situate at the posterior surface of the canal and behind the bulb." The investing mucous membrane was destroyed, probably by the caustic which had been employed to remove the stricture presumed to exist during life.

M. Lallemand sees no way by which such a tumor could be distinguished from an ordinary stricture, more especially when, as in this case, the patient had had blennorrhagia and been cured by the ordinary method of treatment.

2. *Female*. — The female urethra is sometimes the seat of cancerous disease either from the extension of adjacent carcinoma or independently of this. Of the former description, exhibiting itself in the areolar pultaceous variety, a striking example has been figured by M. Cruveilhier¹. The walls of the canal in its entire length and circumference are here converted into a cylinder of that morbid structure, and communicate on the posterior and inferior aspects with a similar cancer of the vagina and uterus. Amussat removed a fungous tumor from the orifice of the urethra of a woman who eventually perished from cerebri-

¹ Livr. xxiii. Pl. 6.

form cancer of the bladder; the anterior wall of the uterus is said to have appeared healthy, yet was destroyed by the contiguity of the vesical encephaloid, which was in the corresponding part softer than elsewhere¹. Ulcerations of the orifice of the urethra occasionally become the seat of secondary cancerous deposit, independently of any similar disease in the rest of the genito-urinary system.

It seems probable that the cellulo-vascular tumor of the lip of the meatus, which is distinguished by its extreme sensibility from carcinomatous growths, may secondarily acquire a basis of scirrhus or become infiltrated with encephaloid matter.

When the urethral production coexists with deep-seated disease, it is of course submitting the patient to unnecessary pain to attempt its removal. Under the contrary circumstances this may be effected with the knife: and the apprehension of excising part of the canal itself should not stay the hand of the operator, as cicatrization follows rapidly, and the shortened part continues to execute its functions satisfactorily. The only inconvenience to be expected from removing the meatus urinarius, as results from an examination of numerous cases by Dr. Hosack² is retention of urine. And this is the very opposite of a common occurrence, for two only among all the cases referred to by this writer were thus complicated,—one related by Mr. Hughes (1769) and the other by himself. In both instances this symptom disappeared spontaneously on the fifth or sixth day.

XI. — EYE.

EYE.—[The eye is subject to two forms of cancerous affection, scirrhus, and encephaloid. The former is a rare disease

¹ Gaz. Méd. Fév. 1830.

² New York Journ. of Med. p. 29. July, 1839.

and only met with in persons of advanced age ; the latter in the greater proportion of cases being a disease of infancy.

Scirrhus. — This affection first manifests itself by a slight derangement of *vision*, attended by a chronic inflammation of the external tunics of the eye, which may last some years. The patient finally begins to suffer from dull pain in the head, and orbit, at the same time the cornea and other textures of the eye become indurated, and thickened, ulceration takes place, first in the conjunctiva, from which it spreads to the surrounding parts involving the lachrymal gland, eyelids, etc. On dissection, all the coats of the eye are found thickened and of a cartilaginous hardness, the size of the eye, however, is not materially increased, the humors being much compressed, partially absorbed, and in a state of disorganization. Extirpation of the organ is the only remedy, and is more frequently followed by a successful result, than in the disease now to be mentioned.

Encephaloid. The encephaloid disease, which by Hey was treated of under the name of fungus hæmatodes, is one of the most intractable affections that we are called upon to manage. The subjects of it are principally children, and according to Mr. Wardrop out of twenty-four cases which came under his observation, twenty were under twelve years of age. The first signs of the disease have been described to be a metallic appearance in the back part of the eye behind the pupil which is enlarged, and immovable. This body gradually advances towards the iris, and finally from an absorption of the humors occupies the whole interior of the organ. While the disease remains in the posterior chamber of the eye, its advance is very gradual ; and Mr. Mackenzie has known instances where it has remained dormant for three years after it was first observed in that situation ; — as soon however as it begins to increase, its advance is very rapid ; the globe of the eye now becomes greatly distended, acquiring

two or three times its natural size, the sclerotic assumes a bluish aspect; and finally either at this part or at the cornea the coats give way, and a bleeding fungous mass shoots out, which from pain or hæmorrhage soon exhausts the patient.

On dissecting a tumor of this description, we find it to be composed of a medullary structure, sometimes interspersed with a dark substance resembling clots of blood, and in most cases having its origin at the optic nerve, which is enlarged, and diseased, sometimes quite into the substance of the brain. Mr. Travers thinks that the disease may sometimes have its origin external to the globe of the eye, and my friend Dr. Bethune informs me that he has lately met with a case, in which the disease commenced in the orbit, forcing the eye outwards from the socket, and gradually involving all the textures of the eye itself, and proving fatal in about a year from its commencement. Extirpation is the only resource, and in a great majority of cases affords but a temporary relief to the sufferings of the patient.

Extirpation of the Eye Ball. The patient should be placed on a table, the head well supported by pillows, and kept steady by an assistant. If the eyelids partake of the disease, they must be removed, which is done as follows. — Being firmly seized with a double hooked forceps, they are to be drawn out so as to tighten the skin. A semicircular cut should then be made with a round edged scalpel, first above and then below the eye, commencing at the internal angle and following the marginal edge of the orbit. If the eyelids are sound, the operation should be done as follows. The aperture of the eyelids is to be enlarged by an incision, an inch in length, at the external commissure, and the eyelids turned back and held apart by an assistant. The globe of the eye is now seized with the hooked forceps, and a straight French bistoury plunged through the conjunctiva

between the eye and the orbit, and carried round so as to completely isolate it on its anterior part. The eye now remains attached by its muscles and the optic nerve, which may finally be divided with a strong pair of blunt pointed scissors curved on the flat side. The bleeding generally ceases spontaneously ; if not, a slight compression may be made on the vessels with a dossil of lint. The divided commissure of the eyelids are to be approximated by means of a suture. All the dressings necessary are a compress of linen, or cotton, dipped in cold water. Some constitutional treatment will be required to obviate the great tendency to a return of the disease. — W.]

XII. — EAR.

EAR. — [The auricle is seldom primarily the seat of cancer, but it occasionally becomes implicated in cancerous affections, affecting the neighboring skin of the face. Fungous excrescences of a malignant nature sometimes have their origin in the membrane lining the external auditory passage, and the membrana tympani ; but more frequently growths occupying this passage, proceed from disease originating in the internal ear or cavity of the cranium. We subjoin some remarks by Mr. Jones from the Cycl. Pract. Surgery, on the diagnosis of these affections from polypus excrescences Treatment of course in this situation is useless.

“The greater rapidity of growth and tendency to hæmorrhage would distinguish an encephaloid growth in the auditory passage from common polypus, supposing the former had not already presented itself in the form of a swelling around the ear.

“In a case of medullary tumor of the internal ear, described by Mr. Travers, the sufferings of the patient were

severe from the confinement of its situation and the displacement of parts; and the deformity was excessive. Externally, the tumor extended from the temporal fossa to the angle of the lower jaw, and internally to the posterior nares and fauces. The mastoid cells were apparently not invaded by the tumor. The jaw became locked, and a bleeding fungus filled the meatus auditorius externus. The same side of the head and face and the muscles of deglutition were paralysed. To this coma succeeded. The patient was nourished with great difficulty, and his death was accelerated by inanition. A post-mortem examination was, to Mr. Travers's great disappointment, refused.

“A case of fungus hæmatodes, involving the ear, is described by Mr. Wishart in the *Edinburgh Medical and Surgical Journal*¹. The patient, a child three years old, about nine weeks before being first seen by Mr. Wishart, began, without any apparent cause, to complain of a severe pain in the right ear, from the external meatus of which a thin fetid fluid was discharged, at times slightly tinged with blood. About a fortnight afterwards a polypous tumor was perceived filling up the meatus externus. About a fortnight after the appearance of this growth, a general swelling was observed around the ear; and behind it a small livid spot about the size of a shilling.

“About this time, *i. e.* a month from his first being observed to complain, a small hard, but not painful lump was felt over the zygoma. The swelling now increased rapidly in size, and extended chiefly backwards and downwards along the side of the neck. The auricle continued to be pushed outwards, and formed the apex of the tumor. Three weeks after its appearance, the livid spot above-mentioned ulcerated, and a fungus grew from it, which frequently sloughed off, but was quickly regenerated, and discharged

¹ Vol. vii. 1811, 2d edition, 1814, p. 48.

a large quantity of fetid bloody matter; and frequently hæmorrhage to the extent of an ounce or two occurred.

“The ulceration and size of the fungus kept pace with the increase of the size of the tumor. About three weeks before the child's death, he was attacked by diarrhœa, and during that time the tumor increased very rapidly, and its substance became much softer. The ulcerated fungus discharged large sloughs, attended with more alarming hæmorrhage; a larger fungus protruded from the external meatus of the ear. Death took place exactly fifteen weeks and four days after the first appearance of the disease.

Dissection. — On examining the cranium after the separation of the morbid mass, an aperture was observed in the squamous portion of the temporal bone. After sawing off the upper part of the cranium, a small part of the tumor was found to have passed inwards through the aperture in the temporal bone, and formed a depression on the middle lobe of the brain, about half an inch in depth. This portion of the tumor was as large as a small egg, of a round shape, connected to the large external tumor by a narrow neck, but did not adhere to the brain; the dura mater was destroyed at the part where the depression was formed. The brain was in other respects sound.

“On comparing a slice of the brain with a slice of the tumor, the appearance was very similar; the only difference being that the texture of the tumor was firmer than that of the brain. On dividing the small internal tumor, it was found to be formed of the same medullary looking substance. On dividing the tentorium cerebelli, a white spot about the size of a sixpence was observed on the cerebellum. This appearance was caused by another small irregular-shaped tumor, protruding from the internal meatus auditorius; the whole of the petrous portion of the temporal bone was destroyed.

“The following appears to be a case similar to the

above, but in a less advanced stage. It illustrates the origin of the disease within the cranium.

“Chassaignac¹ relates a case observed by Boyer of *encephaloid tumor*, which was, in a manner encased in the right half of the protuberance, and had pressed upon almost all the neighboring nerves. But the most remarkable circumstance was, that this tumor penetrated into the internal meatus, and had considerably widened it, so that both portions of the seventh pair had become atrophic.” — W.]

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EXPLANATION OF THE ENGRAVED FIGURES.

PLATE I.

Diameter of the human blood globule = '00025 to '00030 of a Paris inch (Müller).

Fig. 1. Nuclear cells and caudate corpuscula from an enormous medullary carcinoma taken from the abdomen of a female; the smallest cells measure 0.00019, the largest 0.00095 of a Paris inch in diameter.

Fig. 2. Nuclear cell-globules from a medullary fungus in the leg of a woman: they co-existed with caudate corpuscula.

Fig. 3. Elliptic corpuscules from an encephaloid mass of the foot and tarsus.

Fig. 4. Caudate corpuscules united into fasciculi: from a medullary fungus in the thigh of a child.

Fig. 5. Very irregular caudate bodies from a soft fungus of the female mamma: diagnosis doubtful.

Fig. 6. Caudate corpuscula, cells with nuclei and granules, magnified 100 diameters: from encephaloid of the liver.

Fig. 7. Caudate cells, some of them provided with a nucleus and nuclear corpuscula, from a soft juicy osteosarcoma of the lower jaw. The smaller diameter of these cells varies from 0.00021 to 0.00050 of a Paris inch. The substance of this sarcoma was in great measure albuminous, but it also furnished some gelatine, when boiled. [It appears to have been of a "benignant" kind, but the engraving exhibits the characters of these bodies as existing in encephaloid also.]

Fig. 8. Extremely tender fibres from a hyaline fasciculated carcinoma of the female mamma.

Fig. 9. Vessels with thickened walls and gaping on division, seen on a section of scirrhus of the mamma.

Fig. 10. Fibrous bed or stroma of macerated scirrhus of the mamma.

Fig. 11. Cell globules containing small corpuscula, magnified 450 times: from a carcinoma of the mamma.

PLATE II.

Fig. 1. Cell globules from another mammary carcinoma; some of them provided with granules, others with a larger nucleus-like granule.

Fig. 2. Cells with germinal cells and nuclei from an extremely hard ulcerated mammary scirrhus: diameter of the cells from 0.00045 to 0.00119 of a Paris inch.

Fig. 3. Meshes of fibrous fasciculi from reticular carcinoma of the breast, after removal of the cell globules.

Fig. 4. *White granular corpuscles from the reticulum of a reticular carcinoma of the breast, magnified 450 times.*

Fig. 5. *Part of a delicate lamella of a reticular carcinoma of the female mamma, magnified 100 times and seen by transmitted light.*

Fig. 6. *Cells of alveolar cancer [colloid] of the stomach, magnified 100 times.*

Fig. 7. *Still smaller and the smallest cells of the same specimen, magnified 450 times.*

Fig. 8. *Large cells of alveolar carcinoma with fibrous walls, filled with jelly and probably produced by accretion of the smaller cells. It must, however, be remarked that the conversion of the small cells into these large ones with fibrous walls is not directly observed, and that the fibrous condition might also depend on the development of a tissue between the beds of cells, — which tissue would be the stroma for the cellular formations.*

APPENDIX.

IN a former part of this work are given some very elaborate tables on the statistics of cancer in England and Wales. The following paper from the Phil. Med. Examiner is a resumé of a memoir on the relative frequency of Cancer, presented by Mr. Tanchou to the French Academy of Sciences.

“The frequency of diseases, said Dr. T., is in direct ratio to the susceptibility of the organs which are affected by them. When this does not occur, it is to be attributed to some accidental circumstance. Cancer does not escape this general law. But what has not yet been investigated are the order and nature of the causes of this disease. Imagining that the effects of civilization might play no small part in the production of this affection, Dr. T. consulted, with the assistance of the Prefect of the Seine, Count Rambuteau, the civil registers of that Department. 1848 quires, forming the collection from 1830 to 1840, inclusive, 11 years, were examined.

It appears that in this lapse of time there died at Paris, and the districts of Sceaux and St. Denis, 382,851 persons. Of this number, 194,735 were men, and 158,116 were women. 9118 of these died of cancerous affections; of whom 2161 were males; 6957 were women. The excess of the latter was of course 4796¹.

Deaths by Cancer.		Deaths by Cancer.	
In 1830,	668	In 1836,	837
1831,	865	1837,	778
1832,	814	1838,	803
1833,	814	1839,	887
1834,	857	1840,	889
1835,	906		—
Total,			9118

¹ Under the name of cancer, Dr. T. includes not only cancerous ulcers, but scirrhus, carcinoma, osteo-sarcomas, encephaloid tumors, cancers of the skin, nose, lupus, sarcocèles—in a word, all local malignant affections.

That is, about 1·96 per cent. on the deaths of 1830, and 2·40 on those for 1840 ; which proves that cancer is on the increase.

In Paris, alone, during this time :

Deaths by Cancer.		Deaths by Cancer.	
In 1830,	595	In 1836,	728
1831,	756	1837,	674
1832,	712	1838,	703
1833,	721	1839,	779
1834,	752	1840,	779
1835,	800		—
Total,		Total,	7999

That is to say, 2·54 per cent. ; whilst in the arondissements of Sceaux and St. Denis united, there were :

In 1830, deaths	73	In 1836, deaths	109
1831,	100	1837,	104
1832,	102	1838,	100
1833,	93	1839,	108
1834,	105	1840,	110
1835,	106		—
Total,		Total,	1119

Which gives 1·63 per cent. for the suburbs, whilst *intra muros* it was 2·54 per cent., showing that this disease is much more frequent in the capital than in its environs.

Considered with regard to age, he found the following results ;

Age.	Deaths.	Men.	Women.
From 1 to 10 years,	23	9	14
10 to 20	26	13	13
20 to 30	231	62	169
30 to 40	1012	190	822
40 to 50	1975	339	1636
50 to 60	2108	468	1620
60 to 70	2067	598	1469
70 to 80	1315	398	917
80 to 90	335	62	273
90 to 100	26	4	22
	—	—	—
Total,	9118	2163	6955

Examined in connection with the various organs affected, he found :

The Uterus,	2996	Prostate,	5
The Stomach,	2303	Male Mamma,	5
Female Mamma,	1147	Hand,	5
Liver,	578	Forehead,	4
Rectum,	251	Shoulder,	4
Abdomen, (?)	188	Throat,	4
Intestine,	146	Ear,	4
Bladder,	72	Pharynx,	4
Face,	71	Forearm,	3
Mesentery,	66	Kidneys,	3
Ovary,	64	Parotid Gland,	3
Tongue,	36	Tonsils,	3
Eye,	24	Larynx,	3
Jaw,	24	Palate,	3
Brain,	28	Temple,	2
Testicle,	21	Chin,	2
Lips,	16	Back,	2
Vagina,	14	Pancreas,	2
Spleen,	13	Iliac Fossa,	2
Anus,	13	Cæcum,	2
Esophagus,	13	Vulva,	2
Neck,	13	Umbilicus,	2
Cheek,	12	Haunch,	2
Nose,	11	Cranium,	1
Mouth,	11	Cerebellum,	1
Thigh,	10	Ethmoid Bone,	1
Penis,	10	Orbit,	1
Leg,	9	Retina,	1
Thorax,	8	Mastoid Process,	1
Axilla,	8	Back of Neck,	1
Thyroid Gland,	8	Sternum,	1
Scrotum,	7	Pleura,	1
Inguinal Region,	7	Peritoneum,	1
Lung,	7	Jejunum,	1
Colon,	7	Ilium,	1
Head,	6	Female Urethra,	1
Heart,	6	Perineum,	1
Arm,	7	Scapula,	1
Epiploon,	5	Bones of the Ilium,	1

Pelvis,	1	No organs designated ¹ ,	829
Sacrum,	1		—
Thigh,	1	Grand Total,	9118

By this statement it will be seen that there is an increase in cancerous affections, and that they are much more frequent in cities than in the country. This has already been remarked in Berlin², and in England³.

Dr. Tanchou gives the following cases of cancer of the uterus : In 1830, 351 cancers of the uterus ; 1831, 391 ; 1832, 396 ; 1833, 398 ; 1834, 436 ; 1835, 508.

Dr. Tanchou adds that a similar comparative tabular statement between the capitals and large cities, and the rural districts, is much to be desired.

Dr. T. states that cancer is a very ancient disease of civilized life. The first example is that of Mossa, daughter of Cyrus, and wife of Cambyses, B. C. 521. What is very extraordinary is, that, according to Herodotus and others, she was cured by Demeidus, a physician of Croton, without an operation.

It is stated that cancers have been found among the mummies of Egypt ; and M. Hamon, a very distinguished veterinary surgeon, who was fourteen years in the service of Mehemet Ali, never observed cancerous affections among the native females, but occasionally among the Turkish women. Dr. Clot-Bey has made the same remark. Cancer, according to Dr. T., is like insanity, much more common in civilized countries. It has been found that in the East it is much more common among the Christians than Mahomedans. Fabricius Hildanus believed that this disease occurred more frequently in temperate climates than in warm. M. Rouzet says that it is very rare in Africa. The result of Dr. T.'s researches on this point leave no doubt. Dr. Bac, surgeon to the

¹ Under this head those cases are included which were simply marked on the register as *cancer*. Dr. T. seems to think that cancer of the breast was meant in the majority of these cases : which, added to 1147 cases of scirrhus of the female mamma, and 5 in the male, would give 1981 cancers of the breasts in the two sexes.

² Siebold's Journal, 1826.

³ Cyclopedia of Surgery, art. Cancer. [Dr. Walshe questions the influence of a town life on the production or mortality of cancer. See page 111. — W.]

second regiment of African Chasseurs, never saw a case, even at Senegal, where he practised six years. The medical officers of the French Army are agreed on this question. M. Baudens, the surgeon in chief of Valde-Grace, who enjoyed a considerable practice at Algiers for eight years, saw only in that time two or three cases. Finally, Dr. Puzin, who, in 1835, established a civil hospital ten leagues beyond the French outposts, in the midst of the Arabs, did not see a case of genuine cancer out of 10,000 patients.

Dr. Tanchou discusses finally the treatment of cancer. Having examined this disease among animals, he gives some interesting details relative to its frequency, according to age, sex, and the organ affected. He concludes thus : —

1. The number of cancerous diseases seems to increase from year to year, and to be in direct ratio to the civilization of the country and of the people.

2. It is in old persons, and in women more particularly, that this malady is most to be feared. But early life is not exempt from it.

3. The organs that are most sensitive, and of glandular organization, are most obnoxious to it.

4. The cause of this disease would seem to exist in the whole economy, but more particularly in the fluids than in the solids.

5. When there is no external cause it would appear to result from a molecular organic modification, occasioned by various causes, but which, in the majority of cases, we may hope to destroy. (?)

6. In the present state of our science the treatment is only empirical, as in syphilis.

7. This treatment should include all therapeutic means, and should neither be exclusive, nor specific.

8. Finally, after twenty-two observations, which were presented to the Academy, and some scattered facts found in the science, it is not yet demonstrated that cancer is incurable in all cases. You can modify the affection, render chronic an acute case, dissipate, lessen, or render stationary the majority of primary engorgements. And it is to be hoped that we shall yet go further."











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